DeLaRue

2xxx B9 Range

(including 2010, 2610 & 2650)

Banknote Counting Machine

Service Manual

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1. TECHNICAL BULLETINS AND MEMORANDA

Technical Bulletins are numbered consecutively and Customers of a product will receive all Technical Bulletins. To prevent confusion, when a modification is not applicable to all machines, Technical Memorandum are used. These are not numbered.

1.1 Service Manual Amendment

On receipt of a Technical Bulletin or Technical Memorandum which entails a Service Manual amendment, the following actions should be taken:

a. Where the Amendment is a page replacement:

- The relevant page is to be inserted in the Manual and the old page(s) removed. Manual custodians are advised to file the old pages for future reference.
- The Record of Amendments page is to be completed with the Technical Bulletin number (not required for a Technical Memorandum), a brief description of the Technical Bulletin/Technical Memorandum and the date.
- The Technical Bulletin/Technical Memorandum Title page should then be inserted in the section provided at the rear of the manual as a reference. The remainder of the Technical Bulletin can then be destroyed.

b. Where the Amendment is NOT a page replacement:

- The relevant page is to be amended in the manual and the margin next to the amendment annotated with the Technical Bulletin number and date or the Technical Memorandum date.
- The Record of Amendments page is to be completed with the Technical Bulletin number (not required for a Technical Memorandum), a brief description and the date.
- The Technical Bulletin/Technical Memorandum Title page should then be inserted in the section provided at the rear of the manual as a reference. The remainder of the Technical Bulletin can then be destroyed.

1.2 Machine Modification

On receipt of a Technical Bulletin or Technical Memorandum which does not entail a Service Manual amendment but is a modification to a machine, the following actions should be taken:

- This is issued for reference only. The modification will be carried out on machines built in the factory.
- It is important therefore that the complete Technical Bulletin/Technical Memorandum should be kept by the Service Engineer as a local reference. This enables Service Engineers to differentiate between machines of differing build standards. These Technical Bulletins/Technical Memoranda are to be inserted in the Section at the rear of the Service Manual.

1.3 Master Copies

A master copy of all Technical Bulletins/Technical Memoranda should be retained by the Service Manager to be used as a reference if required.

1.4 Record of Amendments

Records of Amendments should not be inserted on any page other than an Amendment Record Sheet.

1.5 Page Replacements

Care must be taken that any page replacements issued in Technical Bulletins/Technical Memoranda contain all previously issued changes.

2. SAFETY WARNING

THIS MACHINE IS A CLASS 1, 3 – WIRE EARTHED PRODUCT, AND REQUIRES THE EARTH CONNECTION TO MAINTAIN CONTINUING SAFETY OF OPERATION.

WARNING : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, FUSES MUST BE REPLACED WITH THOSE OF THE SAME TYPE AND SAME RATING.

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3. PREFACE

This Technical Manual contains technical information for use by Engineers in order to perform Servicing and Maintenance of the 26xx range of Banknote Counting Machines.

4. SPARE PARTS

When ordering spare parts, it will be necessary to give the PART NUMBER and DESCRIPTION as quoted in the illustrated parts list.

If no part number is quoted, then the ITEM NUMBER, DESCRIPTION and KEY TO FIGURE? is to be given.

It will prove to be helpful if the DESCRIPTION **as written** in the appropriate KEY TO FIGURE? is quoted on all orders for spare parts.

IMPORTANT – THE FOLLOWING SECTION ON SAFETY MUST BE UNDERSTOOD AND STRICTLY ADHERED TO BY ALL SERVICING AND OPERATING PERSONNEL.

5. HEALTH AND SAFETY

5.1 High Voltage

Exercise caution when working in areas where mains power is present as hazardous voltages will exist.

Wall isolating switchgear must be installed in accordance with local regulations and standards, and be capable of being either disconnected or locked in the off position.

5.2 High Energy

All servicing personnel are warned of the dangers of arcing and burns from high energy components such as contained in the power supply unit (PSU).

5.3 Moving Parts

Extreme care must be taken by all servicing personnel when working near moving machine parts. This is especially important when covers are open or removed and safety interlock circuits over–ridden.

All items of clothing such as ties, loose overalls and long hanging jewellery should be removed. Long hair should be tied up.

5.4 Cabling And Power

Do not use the colour of cables as an indication of their voltage or polarity.
Always use a test meter to check that the terminals are not live before touching.

5.5 Static Sensitive Devices

Normal precautions concerning the handling of MOS components are applicable in order to minimise the risk of damage to these devices by STATIC ELECTRICAL DISCHARGE. This entails avoiding contact with the pins of these devices and ensuring that when they are removed from a pcb, the pins are strapped together with conductive tape, or placed on a suitably earthed metal plate, thus ensuring that ALL pins remain at the same potential. Any external clothing, overalls, etc., manufactured of NYLON or a similar material, must not be worn as they are capable of reaching extremely high voltage potentials caused by friction during normal wear. These precautions are especially necessary in respect of microprocessor devices.

5.6 Effects of Electromagnetic Fields

The funtion of this machine may be affected by the use of equipment, close to the machine, which is capable of emitting high electromagnetic fields, e.g. mobile phones, security transmitters.

5.7 Solvents

All fluids used for cleaning purposes must be non – toxic and must comply with the relevant COSHH and Health And Safety regulations.

Note: Wherever these symbols appear throughout this manual reference should be made to Paragraph 5 (Health & Safety).

6. MANUAL STRUCTURE

The main part of this Service Manual covers the B9 build of the 26xx series machine. Sections 1 to 6 cover the 2010 machine whist other variants (i.e. 2610 and 2650) and detector options are covered in the Appendices at the rear of the manual.

6.1 Build Identification

Machine builds can be identified by the following features:

B9 – Rounded case mouldings.

B8 – The blocks inside the stacker hopper are moulded in. The note thickness adjuster on the top front of the detector box.

B5 – Melinex strips are fitted to the underside of the detector box. The underside of the detector box is ribbed.

B6 – No melinex strips fitted and the underside of the detector box is smooth.

Both B5 and B6 have the note thickness adjuster on the underside of the detector box.

6.2 Top Level Part Numbers for 26xx B9 Machines

KEY:

SD – size detection
3D – 3 dimensional size
UV – ultra violet
EMG – enhanced magnetics
IR – infra red
SMDS – superior magnetic detection system
CMS – cash management system
VB – mixed bundle value balancing

Top Level No	Type	Detectors								
		SD	3D	UV	EMG	IR	SMDS	CMS	VB	Notes
FT20100109	2010									
FT26100209	2610	●								
FT26100309	2610			●						
FT26100409	2610 LSN									
FT26100809	2610+		●							
FT26500109	2650									
FT26500209	2650			●						
FT26500309	2650				●					Withdrawn from sale 06/02
FT26500409	2650			●	●					Withdrawn from sale 06/02
FT26500509	2650	●								
FT26500609	2650	●		●						
FT26500709	2650	●		●	●					
FT26500809	2650		●						●	
FT26500909	2650		●	●					●	
FT26501009	2650		●	●	●				●	Withdrawn from sale 06/02
FT26501209	2650							●		Withdrawn from sale 06/02
FT26501309	2650			●				●		
FT26501409	2650				●			●		
FT26501509	2650			●	●			●		
FT26501609	2650	●						●		
FT26501709	2650	●		●				●		Withdrawn from sale 06/02
FT26501809	2650	●		●	●			●		
FT26501909	2650		●					●	●	
FT26502009	2650		●	●				●	●	
FT26502109	2650		●	●	●			●	●	
FT26502609	2650 LSN									
FT26502709	2650 LSN			●	●					

Top Level No	Type	Detectors								Notes
		SD	3D	UV	EMG	IR	SMDS	NEW CMS	VB	
FT26503209	2650€I+		●	●				●	●	Model Number changed 06/02
FT26503309	2650€II			●		●		●		Model Number changed 06/02
FT26503409	2650€III						●	●		Model Number changed 06/02
FT26503609	2650€II+		●	●		●		●	●	Model Number changed 06/02
FT26503709	2650€III+						●	●	●	Model Number changed 06/02
FT26503809	2650€Ir		●	●				●		Model Number changed 06/02
FT26504009	2650€I+		●	●				●	●	Euro
FT26504109	2650€I+		●	●				●	●	Euro/Belgium Francs
FT26504209	2650€I+		●	●				●	●	Euro/French Francs
FT26504309	2650€I+		●	●				●	●	Euro/German Mark/Special Mode
FT26504409	2650€I+		●	●				●	●	Euro/Portugal Escudos
FT26504509	2650€I+		●	●				●	●	Euro/Spanish Escudos
FT26504609	2650€I+		●	●				●	●	GBP/Euro
FT26504709	2650€II			●		●		●		Euro
FT26504809	2650€II			●		●		●		Euro/German Mark
FT26504909	2650€II+		●	●		●		●	●	Euro
FT26505009	2650€II+		●	●		●		●	●	Euro/Special
FT26505109	2650€II+		●	●		●		●	●	Euro/Belgium Francs
FT26505209	2650€II+		●	●		●		●	●	Euro/French Francs
FT26505309	2650€II+		●	●		●		●	●	Euro/German Mark
FT26505409	2650€II+		●	●		●		●	●	Euro/German Mark/Special mode
FT26505509	2650€II+		●	●		●		●	●	Euro/Italy Lira
FT26505609	2650€II+		●	●		●		●	●	Euro/Portugal Escudos
FT26505709	2650€II+		●	●		●		●	●	Euro/Spanish Pesetas
FT26505809	2650€II+		●	●		●		●	●	GBP/Euro
FT26505909	2650€II+		●	●		●		●	●	Danish Krona/Euro
FT26506309	2650€II+		●	●		●		●	●	Euro, no User Manual
FT26506409	2650€II+		●	●		●		●	●	Russian Rouble/Euro
FT26506009	2650€III						●	●		Euro
FT26506109	2650€III+						●	●	●	Euro
FT26506209	2650€III+						●	●	●	Euro/Special mode

Section 1

General Description

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1. INTRODUCTION

The 2010 machine is designed as a general purpose bank note counting machine. However, documents of similar and suitable parameters may also be counted. The machine is compact and lightweight, which makes it ideally suited for desktop operation. A general view of the 2010 machine is shown in Figure 1.

The machine has:

- Normal counting speed of 1000 notes per minute (throughput speed).
- Batch size settings of 100 (default), 50, 25, 20, 10, 5 and 0 (which is the continuous count mode).
- Automatic start/restart.
- 3 digit red LED display.
- Count mode.
- Document thickness detector for identifying double, triple and overlapped notes.

2. MAIN SPECIFICATIONS

Electrical	
Voltage	98 – 264V a.c. (110–240V a.c. nominal) 50/60Hz.
Rated Current (max)	118V – 0.7A 230V –0.4A
Mean Power	75W
Mechanical	
Weight	approximately 6kg
Dimensions	Height 190mm Width 285mm Depth 250mm
Document Size Range	Min 100mm x 50mm Max 190mm x 90mm
Note Thickness	0.075 to 0.15mm
Feed Hopper Capacity	500 notes max (with note guides)
Stacker Capacity	100 notes max
Normal Counting Speed (Throughput Rate)	1000 notes/min (The note throughput rate is based on the time taken to complete the cycle of note counting).

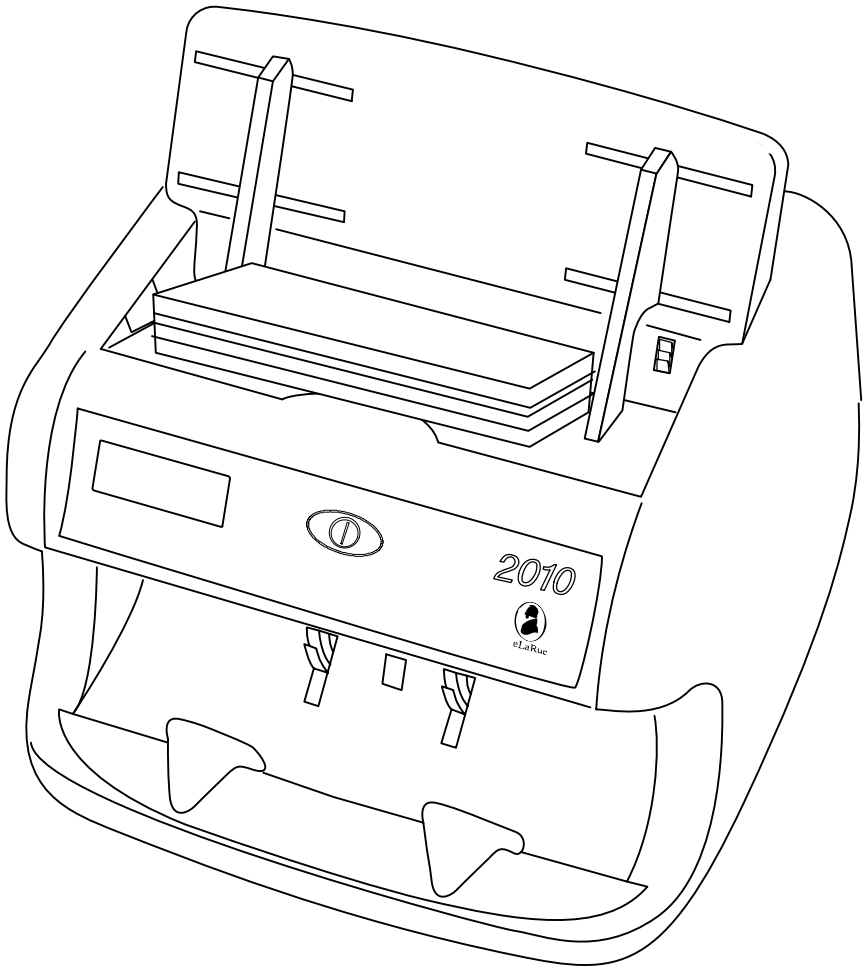


Figure 1. 2010 Banknote Counter General View

3. OPERATION

The mechanics of the 2010 range include a friction feeding system which feeds each note singly, by its long edge, into the separation area then between drive rollers and doubles detect bearings to be delivered into tined stacking wheels, where they are decelerated and stacked in their original order in the stacking hopper.

3.1 Display

The display is a 3 digit red LED display, sited on the left hand side of the control panel.

On power up, the batch value is automatically set to 100, but this number can be changed by pressing the control key (sited in the centre of the control panel) to step through the preset batch sizes of 050, 025, 020, 010 and 000.

Selecting batch value 000 indicates that the machine is in the continuous count mode. The maximum number of notes that can be counted in this mode is 999. After the next note, the display will show '0.0.0.' and flash. Pressing the control key will clear the total and set the display to 0.

The display is also used to show operating messages.

3.2 Basic Controls

A single touch key in the centre of the control panel is the only control necessary to operate the machine. The key is operated by slight pressure at it's centre.

The note thickness adjuster control is located on the front the detector box lid (see Figure 2).

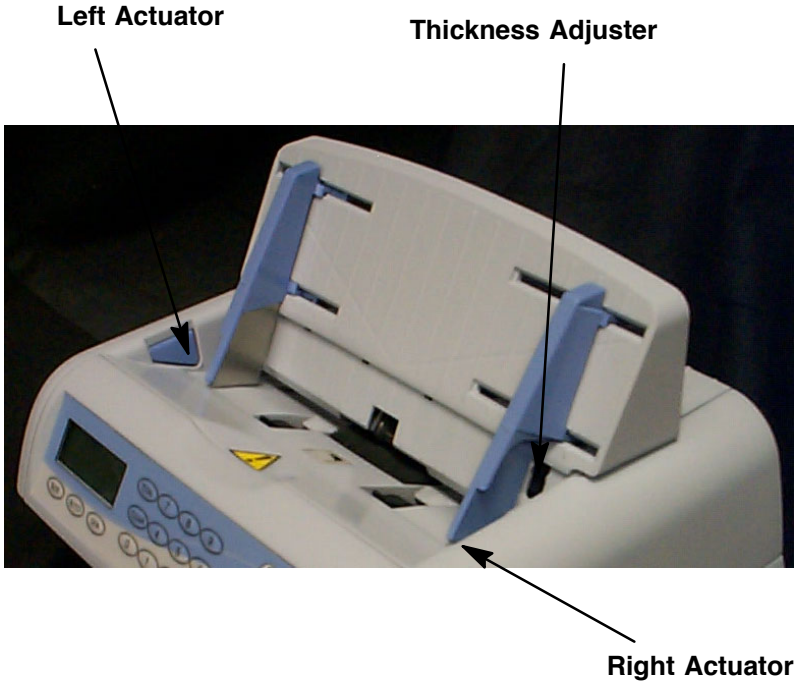


Figure 2. Note Thickness Adjuster Location

4. CONTROL FUNCTIONS

4.1 Control Key

The machines single control key, situated in the centre of the control panel, is the only control necessary to operate the machine. At power up the machine is automatically set to a batch value of 100. Operation of the control key will step the display through the preset batch sizes. Selecting batch size 000 puts the machine in continuous count mode. If the control key is pressed during counting, the machine will stop. Pressing the control key again will restart the count.

4.2 Note Thickness Adjuster

Adjustment of the note thickness gap between the stripping wheels and separation rollers is set by a manually controlled, multi– position wheel adjustment fitted on the front of the detector box lid. Rotation of the wheel adjusts the thickness gap by altering the position of the separator components (see Figure 2 for location).

Rotating the wheel downwards decreases the gap and rotating upwards increases the gap.

5. COUNTING MODES

There are two modes of counting available on the 2010 machine.

5.1 Batch Mode

The required batch quantity is selected via the control key and is shown on the display. Batch size 000 selects the count mode which is described in paragraph 5.2. The machine is programmed such that on power up the batch value is automatically set to 100. If another batch size is needed, the required batch is selected using the control key to step through the preset batch sizes.

The machine automatically commences note feeding if the stacker is empty and notes are placed in the feed hopper. Notes are fed and counted up to the selected batch quantity at which point the feed is stopped.

A sensor is fitted to the machine which monitors the presence of notes in the stacker. On batch complete, and when the notes are removed from the stacker, the feed re–starts if there are still notes in the feed hopper. If the notes are removed from the stacker and there are no notes in the feed hopper the display will retain the previous count until notes are put into the feed hopper and the machine restarts.

The machine is stopped by pressing the control key. If previously fed notes are not removed from the stacker and the feed hopper is not empty, pressing the control key again causes the previous count to continue.

Any stoppages due to 'uncertain counts' removes the partial count on the display i.e. those notes fed since the stacker hopper was last emptied. Following an 'uncertain count' stoppage, notes should be removed from the stacker and recounted. Pressing the control key clears the error message and resets the display to zero prior to feed start.

5.2 Count Mode

The COUNT mode is selected by setting the display to 000 via the control key.

The machine has an autostart facility and commences note feeding if the stacker is empty and notes are placed in the feed hopper. The first 100 notes are fed and counted (assuming the quantity is equal to or greater than 100) at which point the feed is stopped.

A sensor is fitted to the machine which monitors the presence of notes in the stacker. When the first 100 notes are removed from the stacker, the feed will restart if there are still notes in the feed hopper. These notes are added to the previously displayed total.

If the feed hopper empties during a count the display flashes the total to date. The count can be continued by adding notes to the feed hopper. In this instance the machine will automatically restart.

On removing notes (100 batch) from the stacker, the display continues to show the total count to date. On removal of less than 100 notes from the stacker, when the hopper empties the display continues to flash the count to date and is added to it when the feed hopper is replenished.

The machine is stopped by pressing the control key. Pressing the control key again causes the previous count to continue.

Any stoppages due to 'uncertain counts' negates the current part of the count i.e. those notes fed since the stacker was last emptied. Following an 'uncertain' count stoppage, notes should be removed from the stacker and recounted. Pressing the control key clears the error message and resets the display to the previously correctly counted multiple of the batch quantity, the count total or to zero.

5.3 Auto / Manual Start

Auto / Manual start is obtained with the machine powered on by covering the stacker sensor and pressing the control key.You can then toggle between 'AUI' which is Auto Start and 'AUO' which is Manual Start. On power up the machine will default to whichever mode was in use when the machine was turned off

6. CONTROL SENSORS

The following sensors are fitted to the 2010 machine:

6.1 Feed Hopper Sensor

The purpose of the feed hopper sensor is to detect the presence or otherwise, of notes in the feed hopper. The sensor is a reflective opto device which is fitted in the feed hopper.

The presence of notes in the hopper, with the appropriate stacker hopper condition, initiates a feed when notes are removed from the stacker hopper.

The action of the notes as they feed is to wipe clean the sensor of any dust or note debris that might degrade the sensor operation.

6.2 Stacker Hopper Sensor

The purpose of the stacker hopper sensor is to detect the presence or otherwise of notes in the stacker hopper. The sensor comprises a light emitting diode (LED) and a phototransistor device which are located in the stacker hopper area. The feed cannot normally be initiated if the light path of the stacker sensor is obscured. The exception to this is when there are notes in the stacker hopper, after the hopper has been replenished with notes (having emptied) and when the batch is incomplete (in Batch mode) or there are less than the stacker hopper limit in the stacker hopper (in Count mode).

6.3 Transport Sensor

The purpose of the transport sensor is to detect the progress of notes through the machine. The sensor is a reflective opto device located in the detector box.

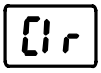
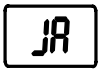
6.4 Doubles Detect Sensors

The purpose of the doubles detect sensors is to measure the thickness of the banknotes as they are transported through the machine. The machine is fitted with two identical sensors so that the thickness of the banknotes is measured along two strips of the note.

7. DISPLAY INDICATIONS AND RECOVERY ACTIONS

7.1 Operator Instructions

The following display indications are given for the conditions shown below:

Display	Reason	Solution
	The machine has stopped as a result of a badly damaged or degraded note.	Remove all of the notes from the stacker. Remove any notes with damage, tape or staples. Press the control key and put notes onto the feed hopper to repeat the count.
	The machine has stopped as a result of a note handling problem.	Remove all the notes from the stacker. Press the control key and put the notes onto the feed hopper to repeat the count.
	One of the sensors is obscured by dirt.	Clean the hopper, stacker and track sensors. Press the control key.
	A note has been left in the machine.	Clear the feed hopper, stacker or note track of any notes. Press the control key.
	Notes are jammed in the note transport.	Switch off the machine. Open the machine by pressing the release buttons. Remove the notes carefully. Close the machine lid. Switch the machine on.
	The top lid is not closed.	Press on both sides of the lid and ensure an audible click is heard. The lid is now closed. Press the control key.
	A half or folded note has been detected in the machine.	Remove all notes from the stacker. Remove all half notes or unfold folded notes. Press the control key and put notes onto the feed hopper to repeat the count.
	3 or more notes have passed through the machine together.	Remove all notes from the stacker. Press the control key. Put the notes onto the feed hopper to repeat the count.
	A fault has been detected in the machine	Switch off the machine and contact your agent's service engineer.

7.2 Operator Access

In order to remove jammed notes or to clean the transport sensor etc, access to the note path is obtained by opening the hinged detector box assembly. The assembly is opened by releasing the left and right actuators (see Figure 2). The detector box assembly must be fully closed before operating the machine.

If the detector box assembly is opened whilst the machine is feeding notes, a controlled stop may occur i.e. there may be notes left in the transport. Under these circumstances the detector box should be closed and the control key pressed to restart the machine. The display will show 'CLr' until the notes in the transport are removed.

Section 2

Mechanical Description

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1. GENERAL

The machine incorporates three independent systems, NOTE FEED, NOTE TRANSPORT and NOTE STACKING. These systems are driven by two separate d.c. motors.

Notes placed in the feed hopper are fed singly into the machine by a friction feed. On leaving the feed hopper, each note is fed into the nip between the separation rubbers and stripping wheels, then between the drive and pinch rollers and then between the drive roller and doubles detect bearings.

Notes, as they exit from the doubles detect bearings and drive rollers, are delivered into a pair of tined stacking wheels, where they are decelerated and neatly stacked in the stacking tray, in the same order as they were fed.

Mechanically, the machine can be broken down into the following assemblies:

- Feed module
- Chassis assembly
- Base tray and power distribution module
- Stacker module
- Detector box module

2. FEED MODULE

The feed module comprises the upper half of the machine along with the feed hopper. The module also incorporates mounting elements for the chassis assembly, the controller PCB and the facia panel.

2.1 Feed Hopper

Notes are placed in the hopper for feeding into the machine, long edge leading. A sensor is fitted on the feed hopper to detect the presence, or otherwise of notes and also initiates the auto–start feature. Notes are removed, singly, from the bottom of the note pile by a pair of feed wheels, in conjunction with a stripper wheel.

3. CHASSIS ASSEMBLY

The chassis assembly consists of the feed motor and drive system to transport notes from the feed hopper to the stacker module via the doubles detection system.

3.1 Feed Wheels

These are a pair of rubber cams, moulded onto the feed shaft. The shaft is driven via a toothed belt from the stripper shaft.

3.2 Stripper Wheel and Separation Rubber Assembly

The separation of notes is achieved by the action of a stripper wheel and associated separation rubbers. The flanged stripper wheel is made of moulded plastic, with moulded rubber segments.

The feed and stripper wheel are both mechanically timed so that their combined effect, with the separation rubber assembly, is to separate notes from the pile and transport them into the nip between the drive roller and pinch rollers. The stripper wheel is driven from the feed motor.

When two notes are fed into the feed gap at the same time, the action of the separation rubber assembly will be to hold back the upper note against the forward feed of the lower note, thus causing the notes to separate.

The dolly roller pivot arm assembly is carried between the separation rubbers. The assembly comprises a pair of spring loaded rollers which cause the rollers to ride the inner section of the stripper wheel. The lowest note in the stack is thus held in contact with the stripper wheel ahead of the separation rubbers.

4. NOTE TRANSPORT SYSTEM

Having passed through the separation area, the note now feeds into the transport system which comprises the Transport Rollers, Pinch Rollers and Doubles Detect Bearings.

4.1 Transport Rollers

These are a pair of moulded alloy hubs fitted with rubber tyres mounted on the drive roller shaft. The shaft is driven, via an 'O' belt from the transport motor. The pinch rollers are mounted in the detector box base and bear on the transport rollers. The two doubles detect bearings, resiliently mounted on a stationary shaft, also bear on the rubber tyres of the transport rollers. The notes are guided into the 'nip' between these sets of rollers and then delivered into a pair of tined stacking wheels. The transport rollers are ground concentric to the drive roller shaft and can only be replaced as an assembled pair.

4.2 Doubles Detect Bearings

This is a pair of bearings each of which fits over a rubber collar, mounted on the stationary doubles detect shaft.

Notes are detected and counted by measuring the deflection of these resiliently mounted rollers. This deflection is determined by monitoring the movement of a plastic 'pin' (one for each roller), in contact with the inner race of the bearing, as it obscures the light path between an infra–red diode and a phototransistor, both sensors being fitted inside the hollowed out sections of the transport shaft.

In operation any eccentricity of the profile of each of the transport rollers, is determined by measuring the 'pin deflection' at defined angular positions prior to notes being fed. When the first note is fed between the rollers, a further set of 'pin deflection' measurements are taken.

The difference between these measurements define the note 'thickness' and 'length'. This becomes a 'reference measurement' with which all subsequent notes are compared to determine whether one or more notes are present.

5. NOTE STACKING

After passing between the transport rollers and double detect bearings, the notes are delivered into a pair of tined stacking wheels, mounted on the stacker shaft, where they are decelerated and stacked. The stacker shaft is directly driven via a twisted 'O' ring belt from the transport shaft.

6. DRIVE MOTORS

Two motors are used on the machine, one to drive the feed system and the second to drive the transport system.

6.1 Feed Motor

This motor is secured to a casting mounted in the chassis. It is fitted with a gear driven pulley which drives the feed components.

6.2 Transport Motor

This motor is secured to a mounting bracket which locates in the stacker hopper moulding and is fitted with an 'O' belt pulley (grub screw fixing) which drives the transport system with an 'O' belt drive.

Section 3

Electrical Description

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1. GENERAL

The 2010 electrical system is based around a microprocessor PCB providing an interface to the sensors, membrane, motor controller and external interface. The method of interfacing is either direct or via a serial link to enable detectors and other devices to be fed along one piece of multi–way cable. An interconnection diagram is shown in Figure 1.

The major electronic elements are :

- Main controller
- Power supply unit
- Sensors :
  - Doubles Detect
  - Feed
  - Timing
  - Stacker
  - Transport
  - Lid Open
- Motor controller
- Motors

WARNING : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, FUSES MUST BE REPLACED WITH THOSE OF THE SAME TYPE AND SAME RATING.

2. MAIN CONTROLLER

This PCB contains the main machine processor and uses an external EPROM for its programme control. There is a non–volatile memory which is used to store configuration data that the machine needs to retain when the power is switched off.

The power to the PCB appears as a 30V input and this is regulated down to 5V on this PCB with a switching regulator, based around U9, and runs at approximately 50KHz. The 5V supply is current limited to 0.5A.

Sensor connections are provided to the doubles detect sensors (left and right), feed and timing sensors. The drive to the feed sensor is modulated to ensure that it is not oversensitive to ambient light, and has a period of about 60 ms with an ‘on’ time of 1 ms.

2.1 Interconnections

The following tables list the connector details to the Main Controller PCB.

SK1 – Doubles Detect (left)

Pin No	Remarks
1	Output to drive LED
2	Signal input from detector
3	Vcc (+5V)
4	Vcc (+5V)

SK2 – Doubles Detect (right)

Connections are as for SK1.

SK3 – Feed Sensor

Pin No	Remarks
1	Output to sensor LED (60ms period, 1ms pulse
2	Vcc return
3	Signal input from sensor
4	Vcc (+5V)

SK4 – Peripheral Bus

Pin No	Remarks
1	Vcc (+5V)
2	Stacker sensor input
3	Reset
4	30V input (+/– 10%)
5	MC2 motor control PWM
6	Track sensor input
7	Timing wheel sensor input, 200 – 1000Hz
8	Vcc return
9	Internal serial bus SCL serial clock
10	Internal serial bus SDA serial data

3. POWER SUPPLY UNIT

The PSU is a switch–mode unit with a single input voltage range of 98 to 264VAC. It provides a semi–regulated output on PL2 of 30VDC +/–10%.

3.1 Interconnections

The following tables list the connector details to the Power Supply Unit.

PL1 – Mains Input

Pin No	Remarks
1	AC Mains
2	AC Mains

PL2 – DC Power Output

Pin No	Remarks
1	Motor supply (+30V)
2	Motor ground
3	Signal ground
4	System supply (+30V)

WARNING

There are voltages present on the power supply which are potentially very hazardous. Be very careful around this unit if the machine is stripped for servicing and connected to the mains.

4. SENSORS

4.1 Doubles detect driven by main controller

The doubles detect sensors are mounted on PCB's which are located inside the bearings of the transport drive. There is a detector on each side of the transport (left and right) and they measure the thickness of passing documents with the interruption of an infra–red beam by a small pin, which follows the movement of the doubles detector bearings. The setting up of this detector is described in section 5, diagnostic 2.

4.2 Feed driven by main controller

This is a reflective sensor which detects the presence of notes placed in the feed hopper. The emitter element is modulated by the main controller directly, to reduce susceptibility to ambient light.

4.3 Timing driven by main controller

This is a transmissive sensor and operates across the slotted timing wheel. It tracks the rotation of the drive components. The emitter element is permanently turned on.

4.4 Transport driven by motor controller

This is a reflective sensor. The emitter element is permanently turned on. It detects the presence of notes as they progress through the machine.

4.5 Stacker driven by motor controller

This is a transmissive sensor and operates across the stacker hopper to detect the presence on notes in the stacker. The emitter element is permanently turned on.

5. MOTORS

The machine uses two small dc. motors with the larger of the two driving the transport and stacker elements. The smaller motor drives the feed components and the stripper wheels. The speed of the motors is controlled by pulse–width modulation of the dc. supply from the motor control PCB.

6. MOTOR CONTROL PCB

This PCB interfaces the motor control requirements from the main controller into the power necessary to drive the transport and feed motors. It also provides braking for the feed motor. These functions are controlled by a microcontroller interfacing to the serial data bus from the main controller.

This PCB also controls the transport and stacker sensors under commands from the main controller via the serial bus.

A thermal fuse FS1 is used to protect the wiring against short circuits and operates at about 0.5A. The fuse automatically resets.

6.1 Interconnections

The following tables list the connector details to the Motor Control PCB.

SK1 – Peripheral Bus

Details for this connector are as SK4 on the Main Controller PCB (refer to paragraph 2.1).

SK2 – Stacker Sensor

Pin No	Remarks
1	Vcc return (from LED)
2	Vcc return (from phototransistor)
3	Signal input from sensor
4	Vcc to LED (+5V)

SK3 – Transport Sensor

Connections are as for SK2.

SK4/SK5 – Interfaces for Machine Options

Pin No	Remarks
1	30V
2	Ground
3	Internal Serial Bus SDA Serial Data
4	Ground
5	Internal Serial Bus SLC Serial Clock
6	Reset
7	Timing Wheel Sensor Input 200–1000Hz
8	Ground

PL6 – Transport Motor

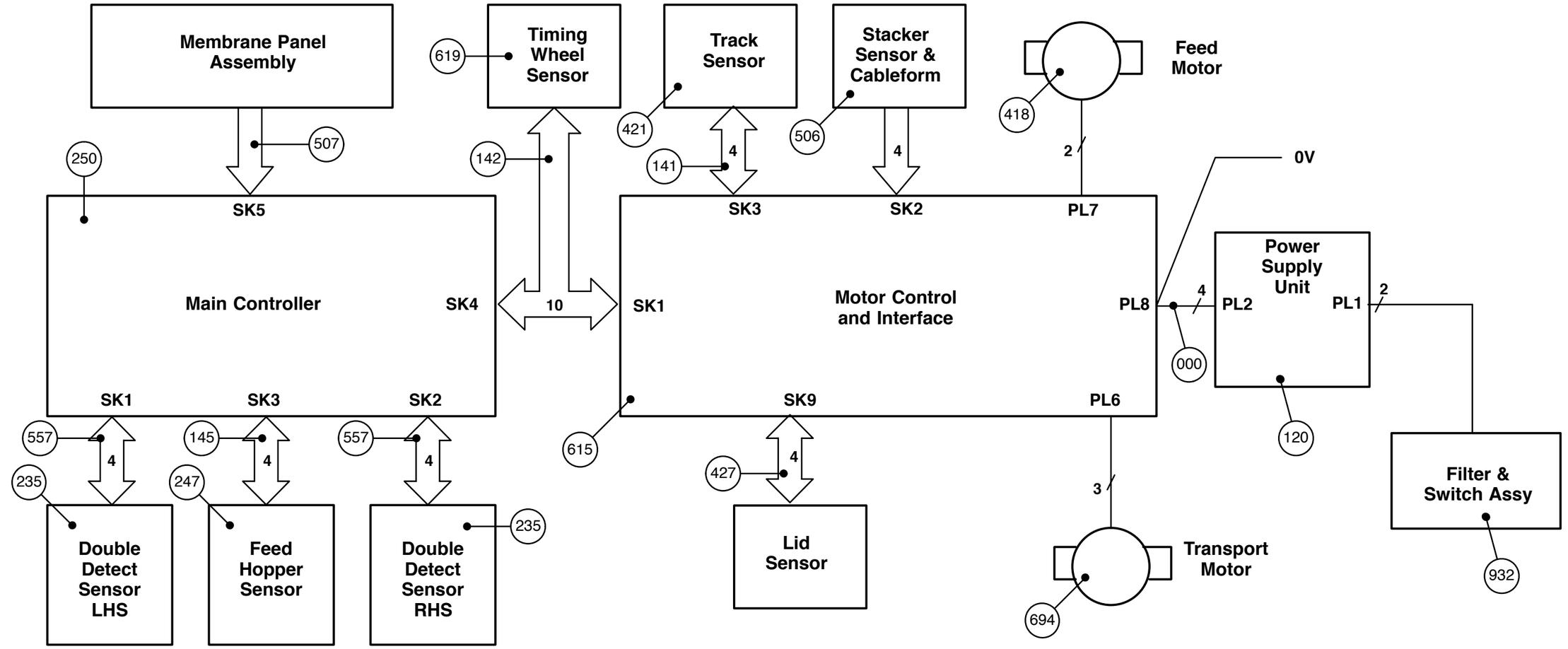
Pin No	Remarks
1	Motor ground
2	No connection
3	Motor supply (+30V)

PL7 – Feed Motor

Pin No	Remarks
1	Motor ground
2	Motor supply (+30V)

PL8 – Power Supply

Pin No	Remarks
1	Motor supply (+30V)
2	Motor ground
3	Chassis ground
4	Signal ground
5	System supply (+30V)



ITEM	DESCRIPTION	PART No.
120	PSU	02620415
141	Transport Sensor Cableform	2606000201
142	Main Controller Cableform	2606000301
145	Feed Sensor Cableform	2606000601
235	PCBP Double Detect	2609530701
247	Feed Hopper Sensor PCB	2609530801
250	2000 Main Controller PCB Kit	2604533604
418	Feed Motor Assy – Buhler B8	2602013201
421	PCBP Ref Track Sensor	2609535504
427	Cableform, Lid Open Sensor	2606004902

ITEM	DESCRIPTION	PART No.
506	Cableform Stacker Sensor B9	2606303602
507	2010 Membrane Panel Assembly	2606304002
557	Doubles Detect Cableform	2606006401
615	Motor Control PCB Kit B8	2604534002
619	Timing Wheel Sensor PCB B8	2609536702
694	Transport Motor Kit	02510186
932	Filter & Switch Assembly + Cables	2606303705
000	Cableform, PSU – A.B. Motor Control	2606006201

ITEM	DESCRIPTION	PART No.
	Cordset Euro – Plug	02540414
	Cordset USA – Plug	02540415
	Cordset UK – Plug	02540516
	Cordset Australia/N.Z. – Plug	02540550
	Cordset India/S. Africa – Plug	02540630
	Cordset Israel – Plug	02540902

Figure 1. 2010 Interconnection Diagram

Section 4

Maintenance

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1. GENERAL

The 2010 machine is designed to provide continued reliable service with a minimum of maintenance. To achieve efficient operation with minimal breakdown periods it is recommended that the machine be subject to regular preventive maintenance.

The frequency of this maintenance will vary depending on the usage of the machine.

In addition to this regular servicing it is important that the users of the machine keep it clean in operation and that they are familiar with the methods for keeping the sensors clear of dust build up. A soft brush or cloth is all that is required to keep the feed, transport and stacker sensors clear of dust and it is suggested that they are cleaned on a weekly basis (minimum).

2. PRECAUTIONS

Extreme care must be taken when working on a running machine if the rollers and/or drive components are exposed.

Normal precautions concerning the handling of Static Sensitive components are applicable in order to minimise the risk of damage to these devices by static electrical discharge. Contact with the pins of these devices should be avoided and when they are removed from PCB's the pins should be connected with conductive foam, or placed on a suitably earthed metal plate. Any external clothing, overalls etc., manufactured of nylon or a similar material, must not be worn as they are capable of generating very high voltage potentials caused by friction during normal wear. These precautions are particularly necessary in respect of the microprocessors and EPROM devices.

3. ROUTINE MAINTENANCE

3.1 Procedure

Carry out the following maintenance routines after every 20 million notes are fed, or every 12 months, whichever comes first:

a. Split the machine in half (section 6, paragraph 2.2) and use a vacuum cleaner only to remove dust from the inside of the machine. **DO NOT** blow the dust away. Ensure that the mains supply is removed before carrying out this procedure.

b. Clean surfaces of all rollers and feed cams etc, using a proprietary cleaner (part number 02340316, Aqueous Solvent).

c. Visually inspect all components for wear or damage and replace if necessary. Regard, particularly, the condition of the rubber components/belts, replacing if they show signs of excess wear or tears.

d. Check the mechanical assemblies for security of fixing screws.

e. Check the timing of the feed cams and stripper wheels, resetting if necessary in accordance with the setting instructions in section 6 paragraph 3.4 (a).

f. Check the separation component setting and adjust if necessary, in accordance with the setting instructions given in section 6 paragraph 3.8 (c).

g. Test the machine for correct operation ensuring that the following functions, at least, are working correctly:

i. Correct counting and batching with the batch set to 10, 50 and 100 notes.

ii. Detection and stopping when doubles and half notes are fed in a batch.

Section 5

Diagnostics

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1. INTRODUCTION

There are two aids for the service technician in diagnosing faults and in setting the machine up:

- Error messages.
- Engineer diagnostics.

2. ERROR MESSAGES

Error messages displayed during machine operation include Chc, CLn, CLr, FEd, HLF, JA, Lid and rFd. When some of these messages are displayed additional information about the type of error can be obtained by removing notes from the feed and stacker hoppers and then pressing and holding the Control Key for approximately 3 seconds. The display will show:

‘ 0’	–	for 3 seconds	
‘Exx’		Normal errors	or
‘Fyy’		Fault errors	

When the control key is released the display is retained for approximately half a second. The code cannot be re–displayed. To clear an error, press and release the Control Key.

3. ENGINEER DIAGNOSTICS

Entry into engineer diagnostics is achieved by first turning the machine off and checking that there are no notes in the feed or stacker hoppers. Press and hold the Control Key and switch the machine on. After the power up sequence the display will show ‘d1’. Release the Control key.

To select a diagnostic mode use the Control Key to cycle through the available diagnostic modes. To enter the required mode block the feed sensor (the simplest way to do this is by placing the hand over the sensor). When the machine has entered the required diagnostic mode clear the feed sensor.

To exit engineer diagnostics it is necessary to turn the machine off.

3.1 Diagnostic 0 (d0) – CRC, Version and Revision Numbers

Diagnostic mode 0 displays the CRC, Version and Revision numbers. On entry into this diagnostic the display shows the upper byte of the EPROM CRC(xxyy) ‘Hxx’. Press and release the Control Key to cycle through the four values:

‘Hxx’	Upper byte of the EPROM CRC
‘Lyy’	Lower byte of the EPROM CRC
‘UVV’	Version stored in Non Volatile Memory (NVM)
‘rRR’	Revision stored in NVM

To exit to base diagnostics block the stacker sensor and press the Control Key.

3.2 Diagnostic 1 (d1) – Sensor Check

Diagnostic mode 1 is the default mode on power up and allows the operation of the following sensors to be checked:

- Stacker
- Transport
- Feed

On entry into this diagnostic the display will show '– – –' with no notes being fed and with a correctly working machine. If the stacker, transport and feed sensors are blocked then unblocked in succession the display will change to '_ – –', '– _ –'. '– – _' and then back to '– – –'.

Press the Control Key to start the double detect profile limit check and the display will show '– o – 'if the profile is within limits. If the profile is greater than the upper limit the top bar will be lit and if the profile is below the lower limit then the bottom bar will be lit.

Block the feed sensor and press the Control Key while the transport is running, to cycle the display through the offset values:

'Lxx'	Left double detect offset value
'rxx'	Right double detect offset value

Press the Control Key, with the sensors unblocked, to stop the transport and display the sensor test.

To exit to base diagnostics block the stacker sensor and press the Control Key.

3.3 Diagnostic 2 (d2) – Auto Double Detect Setting

Diagnostic mode 2 allows the doubles detect gain to be set automatically as follows:

When this mode is entered the display will show 't – –'. Place a pack of test notes* (149 x 80mm – Part No. 02390166) in the feed hopper and press the Control key to start the setup cycle. The machine will feed 10 notes, make it's own adjustments and then feed another ten notes. The cycle will continue until either the machine runs out of notes or 3 consecutive batches of 10 are measured correctly within limits. The display shows 'y – –' where y is the number of batches of 10 with double detect in limits (0, 1, 2 or 3). The middle digit is the LHS double detect indicator and the right digit is the RHS double detect indicator. The middle bar is lit when the double detect is within limits. If the double detect is greater than the upper limit the top bar will be lit and if the double detect is below the lower limit then the bottom bar will be lit.

* The test document is used in preference to an actual banknote due to its consistent note thickness. Using the incorrect document may result in an increased stop rate.

If an out of limits error occurs then the indicator for that double detect will flash.

To exit to base diagnostics block the stacker sensor and press the Control Key.

3.4 Diagnostic 13 (d13) – Cycling of Motors

Diagnostic mode 13 cycles the machine motors as if batching 100 notes, continuously. No attempt is made to count any notes that might be fed.

When this mode is entered the display shows '–oo' to indicate that all motors are idle. Press the Control Key to start the cycle:

'–ot'	Starts the transport motor
'–Ft'	Starts the feed motor with transport still running
'–ot'	Stop the feed with transport still running
'–oo'	No motors running – idle

End of cycle

If the feed hopper sensor is blocked when the Control Key is pressed, the repeat cycle mode is started:

'roo'	No motors running – idle (repeat cycle mode selected)
'rot'	Starts the transport motor
'rFt'	Starts the feed motor with transport still running
'rot'	Stop the feed with transport still running
'roo'	No motors running – idle

Repeat the cycle.

Pressing the Control Key at any time while the motors are running will reset the cycle to idle.

To exit to base diagnostics block the stacker sensor and press the Control Key.

3.5 Diagnostic 14 (d14) – Initialise Non Volatile Memory (NVM)

Entry into diagnostic mode 14 sets the non volatile memory to the default values. The display will show 'SEt' if the check sum is correct, or 'nSt' if the check sum does not match.

To reset the NVM to the default values, block the feed hopper sensor and press the Control Key. The display will show 'dnE' if the reset is carried out successfully, or 'FL' if the reset has failed.

If the NVM is reset to the default values then the auto double detect setting should be carried out as detailed in Diagnostic mode 2.

To exit to base diagnostics block the stacker sensor and press the Control Key.

Section 6

Removal, Overhaul & Replacement

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1. INTRODUCTION

This section describes the removal, overhaul and replacement procedures for the main assemblies of the 2010 machine. The mains supply should be removed prior to any removal/replacement procedure.

1.1 Tools Required

The following tools are required to carry out the procedures detailed in this section:

- Pozidrive screwdrivers numbers 1 and 2 (preferably magnetic).
- Allen key to suit M4 grubscrews.
- Flat bladed screwdriver.
- Torque limited Pozidrive screwdrivers numbers 1 and 2.
- Long nose pliers.
- Side cutters.
- Circlip pliers.

2. DISASSEMBLY PROCEDURES

Before commencing the disassembly procedures remove the detector box and split the machine into its two halves.

2.1 Detector Box Removal

To remove the detector box carry out the following procedure:

a. Release the left and right actuators.

b. Lift open the detector box and remove the detector box lid (Figure 6, item 470) using the finger locations on the sides of the front of the lid by pulling forwards and upwards to release the clips.

c. Disconnect the black static bonding cable connected to the plate spring anchor (Figure 8, item 18) and the transport sensor cable from the track sensor PCB (Figure 7, item 421).

d. Hinge the detector box backwards, lift the box upwards in its location slots and out of the machine.

2.2 Split Machine Halves

To split the machine into its two halves carry out the following procedure:

a. Turn the machine upside down.

b. Remove the two pozi screws securing the base tray (Figure 5, item 8) to the bottom of the machine.

c. Lift off the base tray, lifting the rear for removal and disengaging the two locating features at the front of the base tray.

d. Disconnect the PSU power cable from the motor control PCB (Figure 10, item 615) and the black static bonding cable in–line connector. Set the base tray to one side.

e. Disconnect the feed motor cable and lid sensor cable from the motor control PCB (Figure 10, item 615) and the black static bonding cable from the chassis.

f. Disconnect the transport belt (Figure 9, item 819) and the stacker belt (Figure 9, item 269) from the visible pulleys.

g. Remove the two pozi screws securing the stacker hopper to the feed hopper (Figure 9, item 469). (Leave in place, the screw holding the rear of the transport motor bracket).

h. Lift the stacker hopper and slide to the rear to clear the location features at the front of the machine. Hinge the two machine halves apart.

i. Disconnect the 10 way interface ribbon cable from the motor control PCB (Figure 10, item 615). Withdraw the feed motor cable, the lid sensor cable, the black static bonding cable and the transport sensor cable, and set the stacker hopper assembly to one side.

2.3 Feed Hopper Assembly

To disassemble the feed hopper carry out the following procedure:

a. Remove two screws (Figure 13, item 807) and the internal note guide (Figure 13, item 450).

b. Disconnect the two cables (Figure 13, item 557) from the doubles detect PCB's.

c. Disconnect the cable (Figure 13, item 142) from the timing sensor PCB (Figure 15, item 619).

d. Remove four smart screws (Figure 12, item 821), lift the chassis out of the feed hopper and place to one side.

e. Remove the facia and membrane assembly by releasing the clips underneath the feed hopper, hinging the facia off and disconnecting the membrane tail from the PCB. The LCD gasket may be replaced if necessary.

f. Disconnect the two doubles detect, feed sensor and control cables from the PCB, noting that these connectors are polarised.

g. Unclip the PCB from the feed hopper and remove.

h. Remove the feed sensor PCB and cable by unclipping. Note the cable routing for the re–assembly procedure.

2.4 Stacker Hopper Assembly

To disassemble the stacker hopper carry out the following procedure:

a. Remove the black static bonding cable from the transport motor.

b. Disconnect the transport motor cable from the motor control PCB (Figure 10, item 615).

c. Remove the transport motor and mounting bracket assembly by removing the screw (Figure 10, item 801). Note the position of the bracket locating feature in the moulding for reassembly.

d. If a replacement pulley only is required unscrew grub–screw (Figure 15, item 880) and remove the drive pulley.

e. Remove the stacker wheel assembly (Figure 10, item 704) with its black static bonding cable, by unclipping the two moulded stacker bearings from the stacker hopper.

f. Disconnect the stacker sensor and transport sensor cables from the motor control PCB.

g. Remove the motor control PCB (Figure 10, item 615) by pulling out black buttons from fixing clips and lifting it up and out of the stacker hopper.

h. Remove the stacker sensor and emitter and their cable by unclipping them from the stacker hopper. Note the routing of the cable through the features in the stacker hopper moulding to aid reassembly.

2.5 Chassis Assembly

To disassemble the chassis assembly carry out the following procedure:

a. Remove the transport drive belt (Figure 9, item 819).

b. Remove the timing sensor PCB (Figure 15, item 619).

c. Remove the circlip from the timing disc (Figure 14, item 267) and remove the timing disc. Remove the circlip from the idler pulley and remove the pulley and small O–ring belt. Remove the central support by unclipping it from the chassis.

d. Slacken the two long screws and remove two short screws securing the double detect assembly to the chassis assembly. Remove the doubles detect and drive roller assembly and place to one side.

e. Cut tywrap securing the feed motor cable to the chassis.

f. Remove four screws and lift out the feed component assembly.

g. Pull out the feed and stripper shafts from the end casting adjacent to the feed motor.

h. Remove the end casting opposite the feed motor by releasing the clips retaining both of the bearing housings on the feed and stripper shaft assemblies (Figure 15, items 710 and 711).

i. Remove the timing belt.

2.6 Double Detect and Drive Roller Assembly

To disassemble the double detect assembly proceed as follows:

a. Take out the long screws previously loosened at step 2.5d.

b. Pull off the end casting opposite the drive pulley, away from the double detect assembly (Figure 14, item 33) and the transport shaft assembly (Figure 15, item 712). Take out the double detect assembly.

c. Loosen grubscrew (Figure 15, item 880) and pull off the transport pulley (Figure 15, item 271).

d. Pull off the other end casting by releasing the clips retaining the bearing housing.

e. Remove the two innermost screws. Slide the double detect bearings (Figure 16, item 809) off the rubber collars towards the inside of the machine and remove the collars (Figure 16, item 353) and pins (Figure 16, item 349).

f. Remove two outermost screws (Figure 16, item 810), lift out the static bonding wire (Figure 16 item 886), and remove the two PCB's (Figure 16 item 235).

2.7 Detector Box

To disassemble the detector box carry out the following procedure:

a. Remove two screws (Figure 7, item 926) securing the separation assembly to the detector box D/A (Figure 7, item 600).

b. Remove the separation assembly.

c. Remove the transport sensor PCB (Figure 7, item 421).

2.8 Separation Assembly

To disassemble the separation assembly proceed as follows:

a. Remove the dolly roller spring (Figure 8, item 6) from the plate spring anchor (Figure 8, item 18).

b. Remove four screws (Figure 8 item 7) and remove the separation shaft assembly.

c. Remove two screws (Figure 8, item 7) and washers (Figure 8, item 17) securing the separation rubber assembly (Figure 8 part no 2602025602) to the separation shaft assembly.

3. RE–ASSEMBLY PROCEDURES

Re–assembly is the reverse of disassembly in the following sequence :–

3.1 Separation Assembly
3.2 Detector Box Assembly
3.3 Double Detect Assembly
3.4 Chassis Assembly
3.5 Stacker Hopper Assembly
3.6 Feed Hopper Assembly
3.7 Joining Machine Halves
3.8 Detector Box Replacement and Setting of Separator Gap
3.9 Test of Re–assembled Machine

3.1 Separation Assembly

To re–assemble the separation assembly carry out the following procedure:

a. Locate the separation rubber assembly (Figure 8, part no 2602025602) on the separation shaft assembly and secure using two screws (Figure 8, item 7) and washers (Figure 8, item 17).

b. Locate the separation shaft assembly on the adjuster shaft assembly (Figure 8, item 23) and secure using four screws (Figure 8, item 7). Ensure that the ledges on the two castings are held parallel to the shaft and check that the adjuster knob rotates freely.

c. Locate the dolly roller spring (Figure 8, item 6) on the plate spring anchor (Figure 8, item 18).

3.2 Detector Box Assembly

To re–assemble the detector box assembly carry out the following procedure:

a. Clip the transport sensor PCB (Figure 7, item 421) into the detector box D/A (Figure 7, item 600).

b. Place the separation assembly into the detector box D/A and secure using two screws (Figure 7, item 926), tightening the left hand screw (viewed from the front of the machine) first..

3.3 Double Detect Assembly

To re–assemble the double detect assembly carry out the following procedure:

a. Slide two bearings (Figure 16, item 809) to the centre of shaft (Figure 16, item 279). Locate the two PCB's (Figure 16, item 235) into the shaft.

b. Place the static bonding wire (Figure 16, item 886) into position, secured at each end underneath the two outermost screws (Figure 16, item 810) holding the PCB's to the shaft and inside the inner races of the two bearings.

Note: Screws to be torque tightened to 1.1Nm.

c. Place the two pins (Figure 16, item 349) into the collars (Figure 16, item 353) and locate onto the shaft. Slide the two bearings (Figure 16, item 809) onto the collars. Ensure that the static bonding wire is located to the side of the pins, on top of the collars but underneath the bearings.

d. Secure the two innermost screws (Figure 16, item 810).

Note: Screws to be torque tightened to 1.1Nm.

e. Place the end casting onto the transport shaft assembly (Figure 15, item 712) by clipping the bearing into place.

f. Locate the transport pulley onto the end of the transport shaft protruding through the casting and secure with the grubscrew using Loctite 222, applied along the entire length of the grubscrew.

Note: Do not dip the grubscrew into the adhesive or return contaminated adhesive to the bottle after using. Do not mix the adhesive with activator. Loctite 222 has a shelf life of one year. The adhesive takes 3 hours to reach its ultimate strength.

g. Locate the double detect assembly into the casting.

h. **Gently** press the free ends of the shafts together and insert into the opposite end casting and place aside.

Note: Be careful not to over stress the Doubles Detect Shaft, by bending, during this assembly operation.

i. Loosely assemble the 2 longer screws into the ends of the Double Detect Shaft.

3.4 Chassis Assembly

To re–assemble the chassis assembly carry out the following procedure:

a. Push the stripper shaft assembly into the feed bearing housing fitted with the feed motor, ensuring that the gears are correctly meshed.

b. Push the feed shaft assembly into this housing.

c. Line up the stripper and feed shafts so that the flats on the timing pulleys (at the end opposite the feed motor) line up.

d. Place the timing belt over the two pulleys on the free ends of the shafts.

e. After setting rest the assembly on a flat surface, as shown in Figure 1. Place a straight edge across the raised pips on the bearing housings. Rotate the feedshaft anticlockwise so that the feed cams are touching the stright edge as shown in Figure 1.

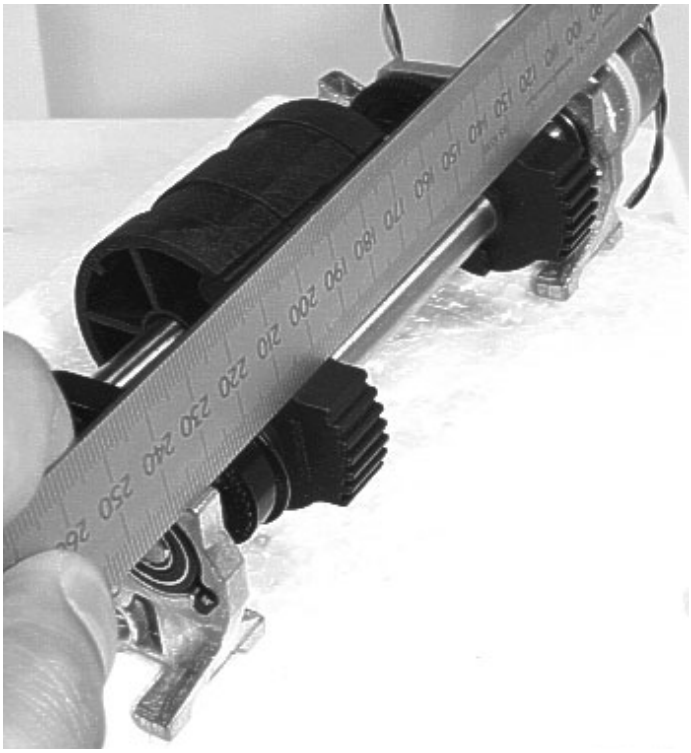

Figure 1. Chassis Assembly Setting

f. Measure between the edge of the ribbed section of the separation roller and the shoulder of the feed cam as shown in Figure 2. A measurement of 18 ±1mm should be obtained.

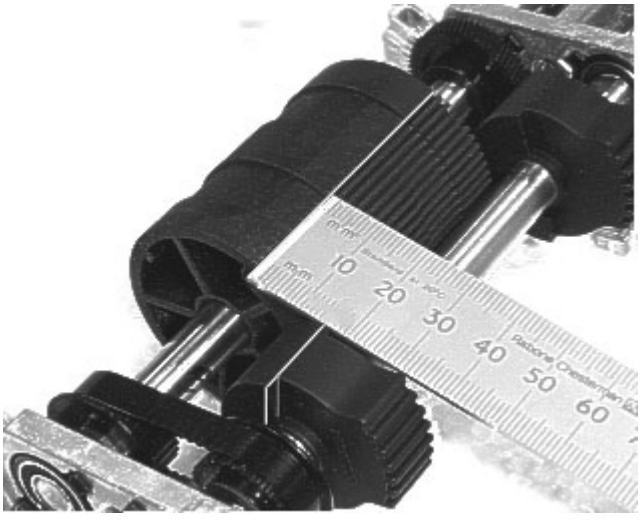

Figure 2. Chassis Assembly Measurement

g. Place this assembly into the chassis, lining up the casting location pips, and secure with 4 screws, routing the feed motor cable on the inside of the chassis, securing with a tywrap.

h. Place the double detect and transport shaft assembly (from 3.3) into the chassis and secure with two short screws. Torque to 1.25N. Tighten two long screws ensuring the correct location of

the bearing housings in the chassis and use of the correct length of screw. Torque the long screws to 1.8Nm.

i. Replace the transport drive belt (Figure 9, item 819) over the transport pulley (Figure 15, item 271) inside the chassis tab features.

j. Replace the idler pulley, timing disc, small O–ring belt and circlips.

k. Check that the guide belt bias is positioned against the dimple so as to separate the belt at the point where it crosses (refer to Figure 3).

Note: If the screw securing the faston tab to the chassis has been removed, re–tighten it to a torque of 1.25Nm.

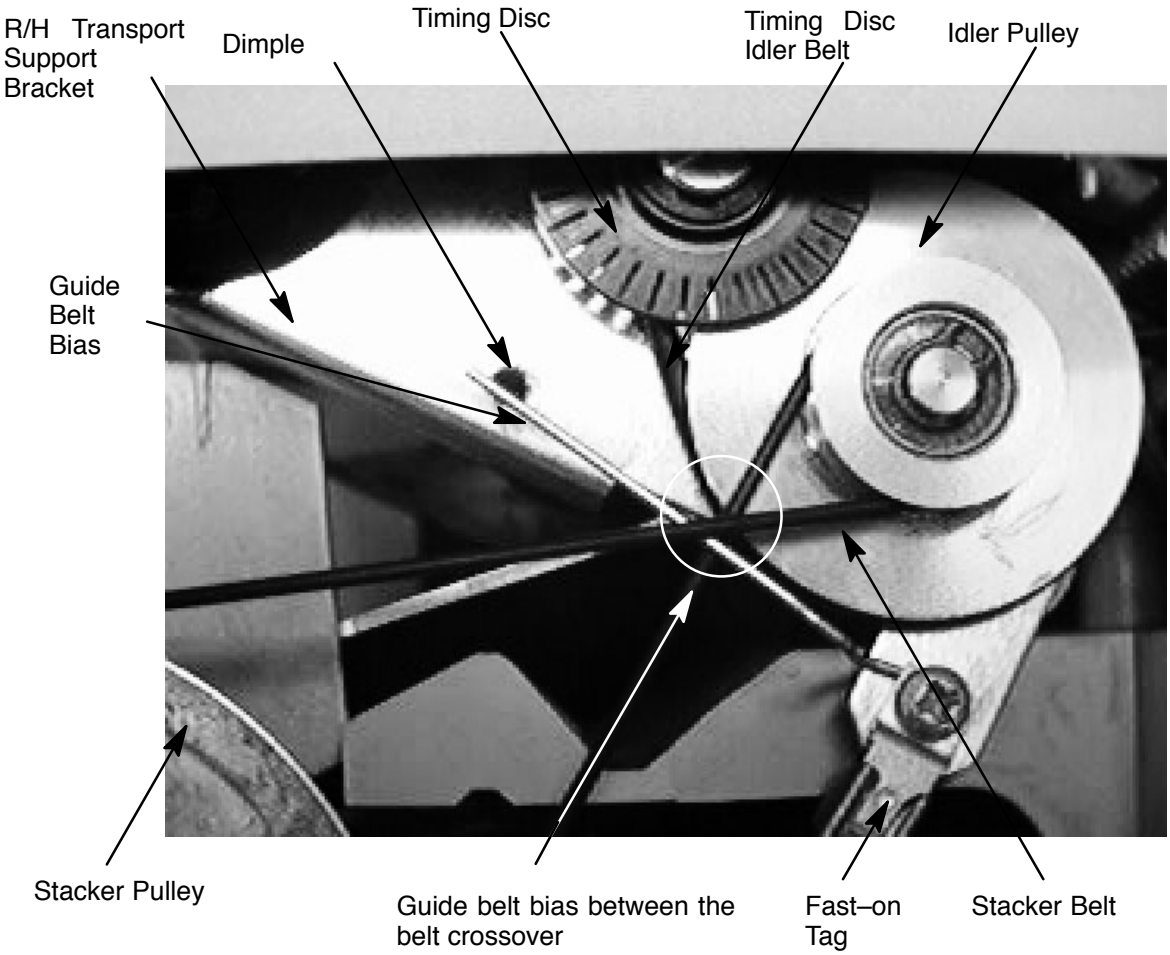

Figure 3. Guide Belt Bias Alignment

3.5 Stacker Hopper Assembly

To re–assemble the stacker hopper assembly carry out the following procedure:

a. Replace the stacker sensor elements and cable into their housings in the stacker hopper (Figure 9, item 469). Route the cable, clear of the stacker bearing aperture.

b. Replace the motor control PCB (Figure 10, item 615) by locating in the moulding channel, against the moulding supports. Locate and secure with two fixings to the stacker hopper. Connect the stacker cableform to the PCB (SK2).

c. Reconnect the transport sensor cable to the motor control PCB (SK3).

d. Place the stacker wheel assembly (Figure 10, item 704), with its static bonding cable attached, into position and push the two bearing clips into the location holes in the stacker hopper moulding until they click into place.

Note: If the screw securing the static bonding cable has been removed, re–tighten it to a torque of 0.2Nm.

e. Place the transport motor and bracket into the stacker hopper, locating the corner of the bracket underneath the moulding feature in the stacker hopper, and secure with the screw, ensuring that the bracket seats correctly on the stacker hopper moulding. Torque the screws to 1.6Nm. Reconnect the motor cable to the motor control PCB (Figure 10, item 615). Reconnect the static bonding to the motor.

f. If replacing the transport motor pulley apply Loctite 222 to the entire length of the grubscrew prior to assembly in accordance with the instructions in paragraph 3.3 (f).

3.6 Feed Hopper Assembly

To re–assemble the feed hopper assembly carry out the following procedure:

a. Clip in the main processor PCB to the feed hopper moulding (Figure 11, item 579), re–fitting the EPROM if necessary.

b. Connect the two double detect, feed sensor and control cableforms to the PCB, observing the correct routing.

c. Replace the facia and membrane assembly by connecting the membrane tail, locating the hook features of the facia, and then clipping into place on the feed hopper.

d. Replace the feed sensor PCB and cableform, by clipping into position. Ensure correct cable routing through the moulding features.

e. Place the chassis assembly into place in the feed hopper and secure in position with 4 screws, torque to 1.25Nm, tightening the rear two screws first. Ensure that the feed motor cable exits the chassis between the Double Detect and Drive Shafts.

f. Reconnect 2 double detect cables (Figure 13, item 557) to the double detect PCB's.

g. Reconnect the cable to the timing wheel sensor PCB (Figure 15, item 619).

h. Replace internal note guide (Figure 13, item 450) and secure with 2 screws (Figure 13, item 807).

3.7 Joining Machine Halves

To join the machine halves carry out the following procedure:

a. With the stacker and feed hopper assemblies positioned as in Figure 9, reconnect the control cableform to the motor control PCB (Figure 10, item 615).

b. Route the transport sensor cableform and the black static bonding cable down the centre hole in the rear shelf of the stacker hopper. Route the feed motor cable and lid sensor cableform down the rear corner of the stacker hopper.

c. Lift the stacker hopper and close the two machine halves ensuring the transport belt (Figure 9, item 819) and the cables are not trapped. Ensure that the excess control cable is pushed into the feed hopper and that the motor and lid sensor cables are pushed fully into the stacker hopper.

d. Locate the two ledge features on the feed hopper by sliding the stacker hopper forward onto them.

e. Locate the transport belt onto the motor pulley. Fit the stacker belt by looping it over the idler pulley, giving it a 180° twist and then locating it over the stacker pulley. Ensure that the 'guide belt bias' is situated between the twist of the belt to prevent the belt rubbing on itself.

f. Reconnect the feed motor cable to the motor control PCB and the black static bonding cable to the chassis. Reconnect the lid sensor to the motor control PCB.

g. Secure the machine halves with 2 screws. Torque to 1.2Nm.

h. Take the base tray assembly and reconnect the PSU power cableform to the motor control PCB (Figure 10, item 615) and the black static bonding cable in–line connector.

Note: When replacing the base tray assembly ensure that the switch cableform is wound around the central support pillar in a clockwise direction.

i. Locate the two tab features on the base tray into the stacker hopper, dropping the rear of the tray down whilst locating the on/off switch in its mounting slot, and secure with 2 screws. Torque to 1.6Nm.

j. Turn the machine the correct way up.

3.8 Detector Box Replacement and Setting of Separator Gap

To replace the detector box and set the separator gap carry out the following procedure:

a. Insert the detector box into the location slots in the feed hopper. Click the detector box down into its closed position.

b. Reconnect the black static bonding cable to the separation assembly and the transport sensor cable (Figure 9, item 141) to the transport sensor PCB.

c. To set the separation gap proceed as follows:

i. Loosen the two set screws (Figure 8, item 7) to finger tight.

ii. Rotate the adjuster knob to the fully down position and then up by five clicks.

iii. Adjust the separation mounting until the separation rubber lies symmetrically in the grooves of the stripper wheel at its leading edge, push it downwards until light resistance is felt when rotating the stripper wheel back and forth.

iv. Tighten the two set screws (Figure 8, item 7).

v. Open the separation gap by three clicks on the adjuster knob.

vi. Check that the gap on each side is between 0.1mm and 0.15mm with a feeler gauge. If this setting is not achieved repeat the set up procedure.

3.9 Test of Re–assembled Machine

To test the re–assembled machine carry out the following procedure:

a. NOVRAM (Section 5, paragraph 3.5).

b. Prior to the test of the re–assembled machine the doubles detector requires setting. Carry out the procedure detailed in Section 5 paragraph 3.3 to achieve this.

c. Carry out the initialisation and calibration of the following items as necessary:

- on power up, check all display segments operate.
- calibrate the doubles detector (Section 5, paaragraph 3.3).
- carry out a check of all sensors (Section 5, paragraph 3.2).
- feed at least 1000 notes in batches of 100 and 50 to ensure correct operation of feed components and to confirm counting performance.

KEY TO FIGURE 4			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
496	B9 2600 NOTE GUIDE SUPPORT	2614016001	1
577	2000 NOTE GUIDE D/A MAROON R/H	2602020803	1
578	2000 NOTE GUIDE D/A MAROON L/H	2602020903	1

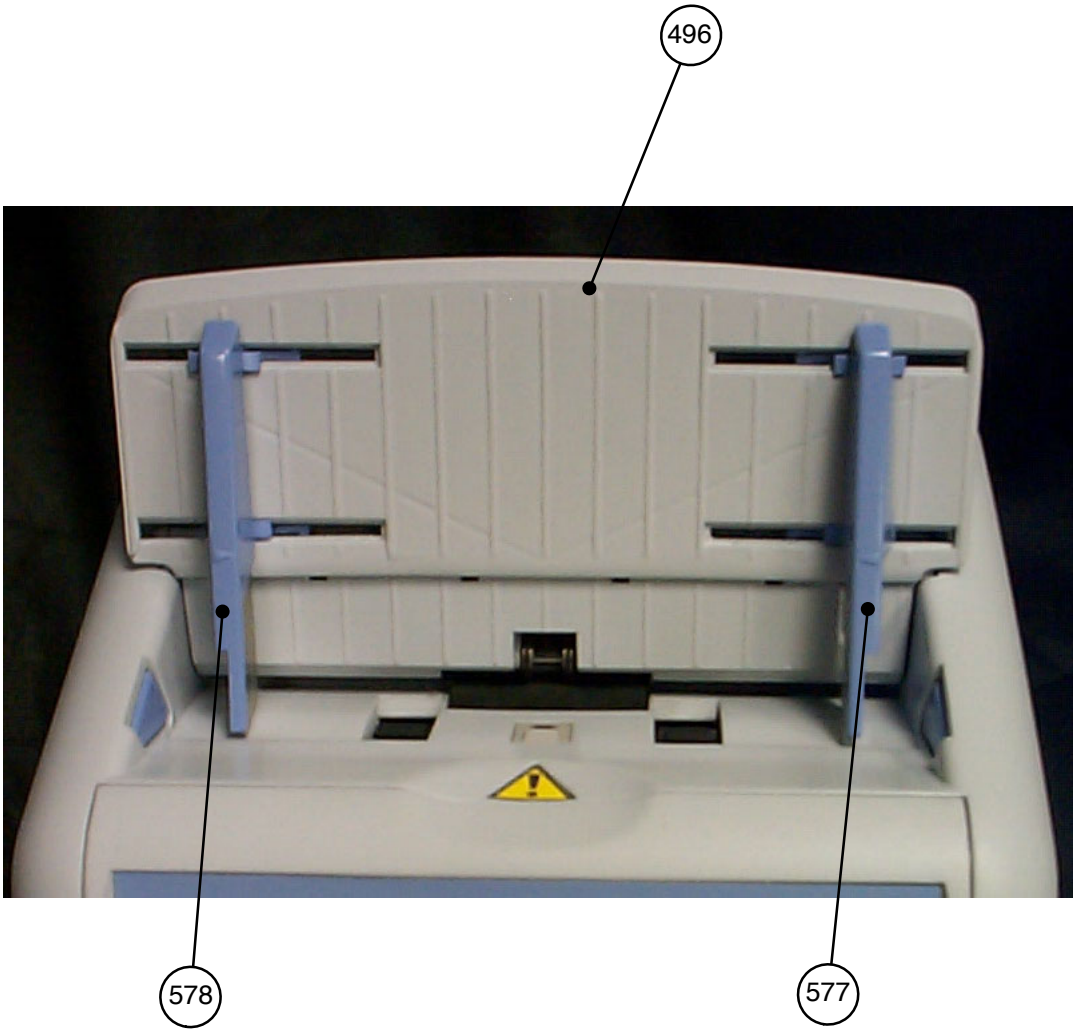

Figure 4. 2010 Note Guides

KEY TO FIGURE 5			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
1	SCREW M4 X 8 PAN POZI MS ZCEP	00460228	2
2	SCREW STAP NO6 X 1/4 PAN POZI	00461415	1
3	WASHER M4 SFTY SPNG STL	00462073	1
4	FRONT FOOT	02410263	2
5	WASHER M4 EXT FAN DISC MS ZCEP	02460255	2
6	STANDOFF PLC BSRE–4	02460411	3
7	STANDOFF PCB SUPPORT 6.4MM	02460557	1
8	BASETRAY DA B9	2602311301	1
9	POWER SUPPLY OPTION KIT	2604001801	1
10	CBLFM ANTI STATIC BONDING	2606003701	1
11	CBLFM ASSY, IEC SOCKET	2606303705	1
12	REAR FOOT	2614003702	2

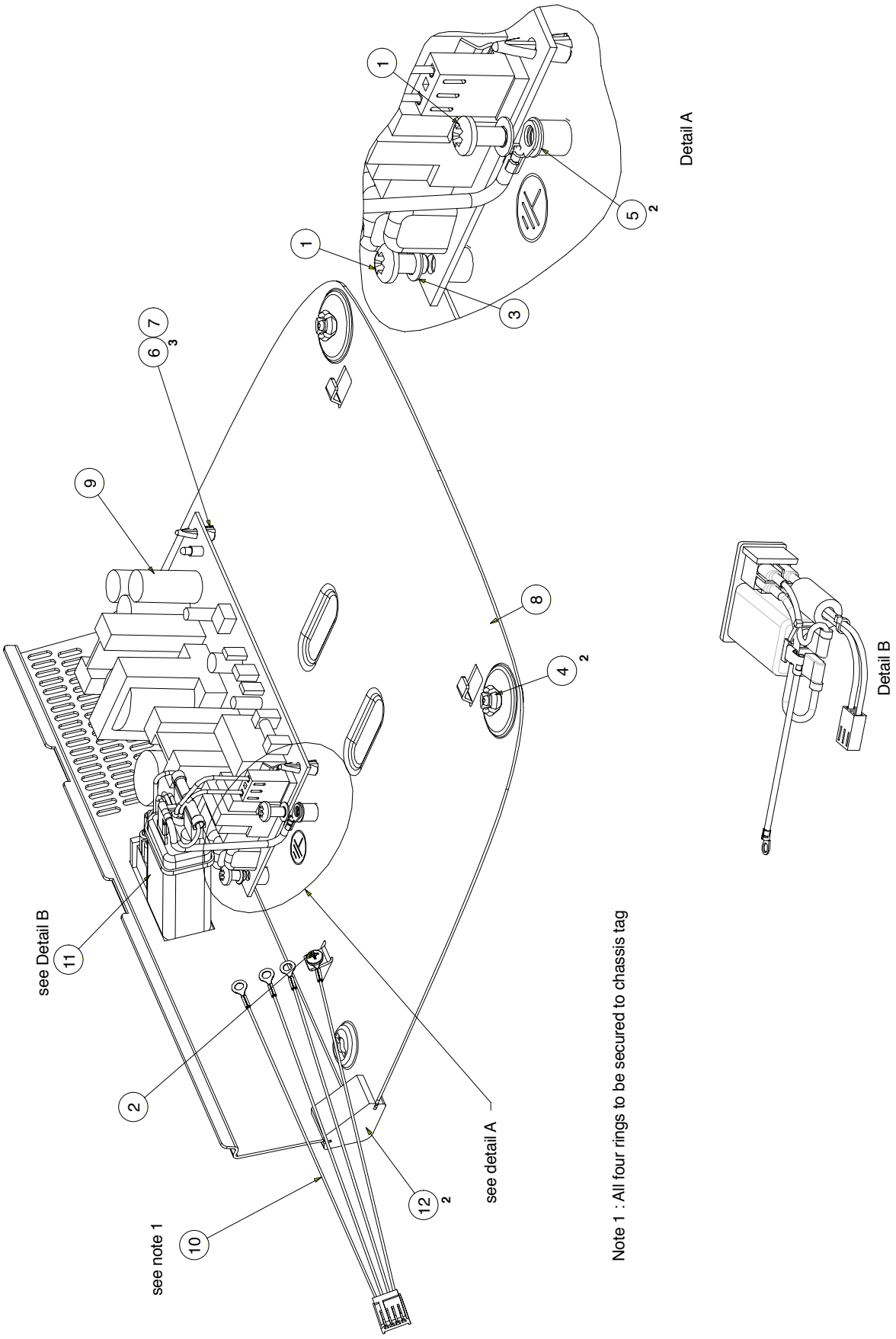

Figure 5. Base Tray Assembly (2602311801)

KEY TO FIGURE 6			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
470	DETECTOR BOX LID – B9	2602316601	1
600	DETECTOR BOX D/A – B9	2602317301	1

Note: See Euro detectors for the Euro detector box base.

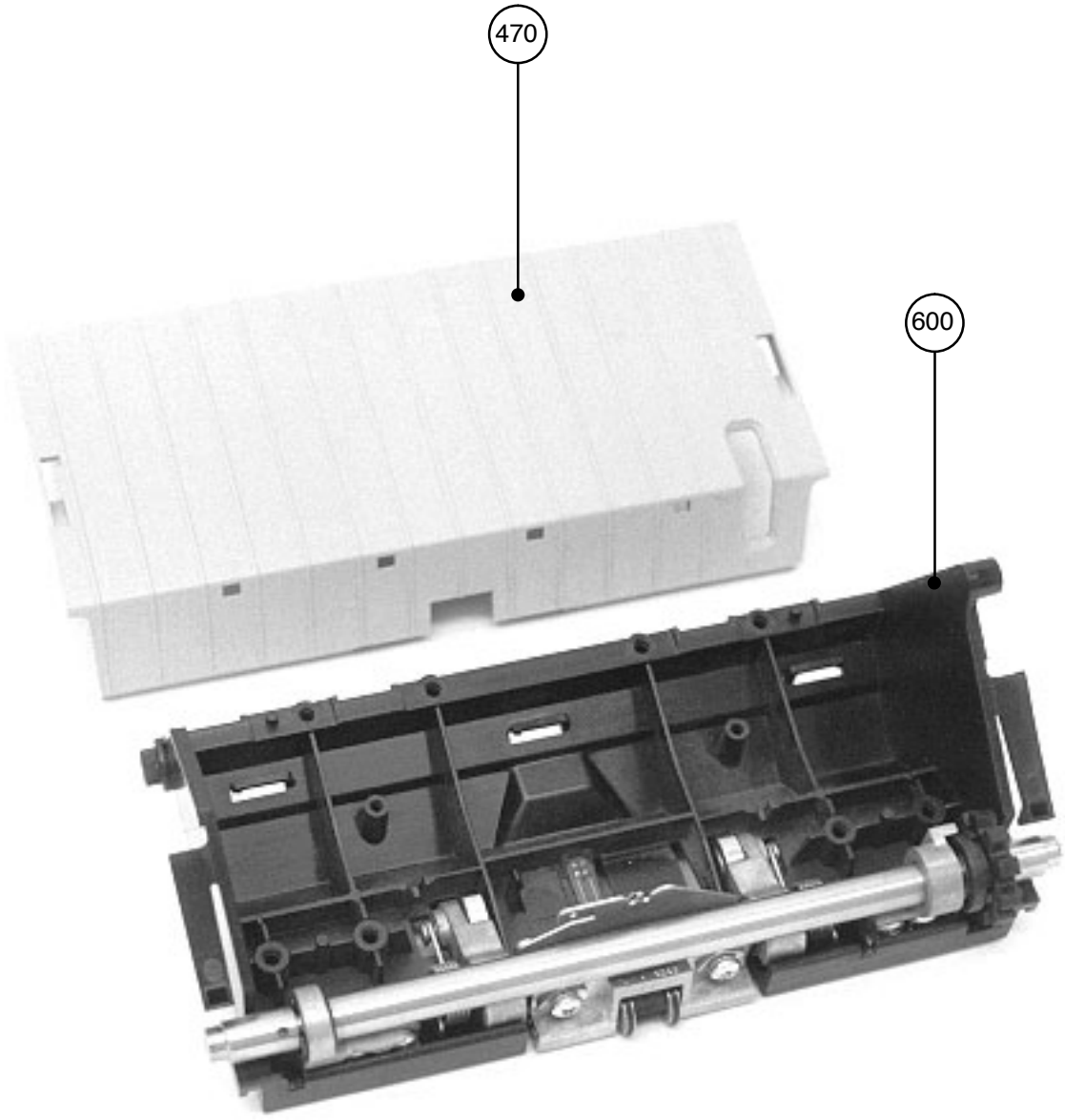

Figure 6. Detector Box Assembly

KEY TO FIGURE 7			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
421	PCBP REF TRACK SENSOR	2609535504	1
600	DETECTOR BOX D/A – B8	2602018902	1
926	SCREW M4X12 CSK SKT HTS BLKOX	00464408	2

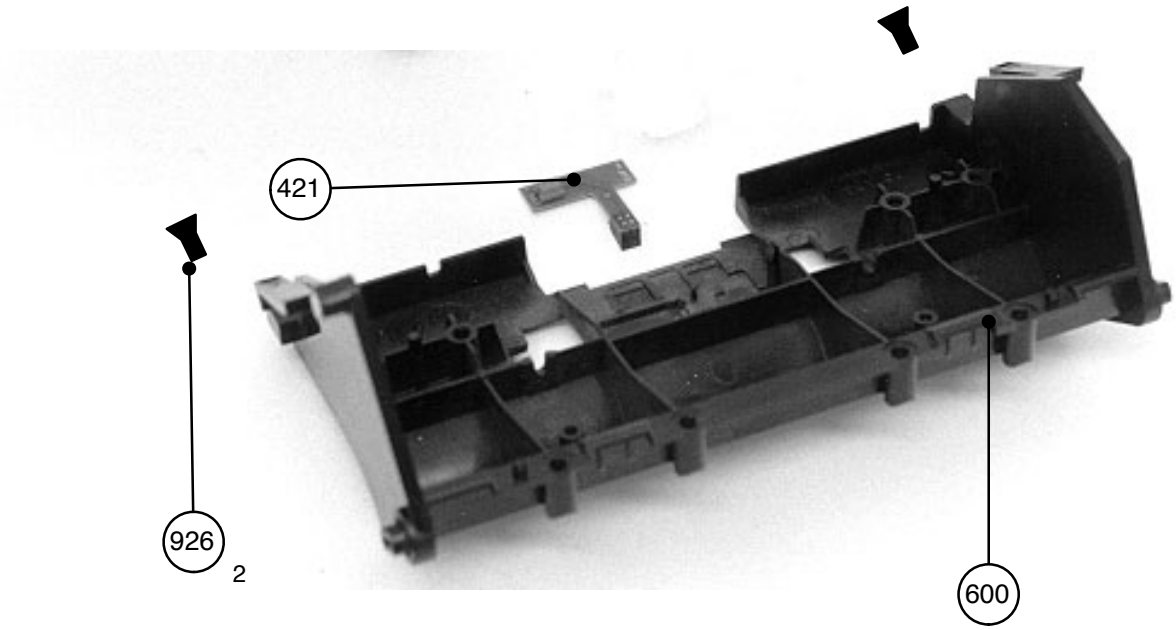

Figure 7. Separation Assembly

KEY TO FIGURE 8			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
1	CIRCLIP EXT SHAFT 9.5	00420110	6
2	WASHER M3 FORMA MS ZCEP	00460304	2
3	PIN SPL HVYDY 2X16LG	00480737	1
4	ADHESIVE LOCTITE 415	00750018	1
6	SPRING EXT	02430333	1
7	SCREW M4X12 PAN POZI/WASHER	02460343	6
8	SCREW M3X8 PAN POZI	02460479	2
10	SEPARATION RUBBER ASSY B8	2602025603	1
11	PIVOT ARM ASSY	2602306701	2
12	ADJUSTER MOUNTING R/H B8	2610002305	1
13	ADJUSTER MOUNTING L/H B8	2610002406	1
14	ADJUSTER KNOB	2614010101	1
15	ADJUSTER BUSH	2614010201	1
16	PIVOT ARM PRESSURE ROLLERS	2614013601	1
17	WASHER SQUARE – SEPARATION MTG	2616004601	2
18	PLATE SPRING ANCHOR	2616006601	1
19	PRESSURE ROLLER	2620000803	1
20	EDGE STRIP PLT SPNG ANCHOR	2620011901	2
22	SEPARATION SHAFT	2620018202	1
23	ADJUSTER SHAFT – B8	2620018803	1
24	ADJUSTER SPRING	2643000602	1
25	SPRING PINCH ROLLER L/H B9	2643001501	1
26	SPRING PINCH ROLLER R/H B9	2643001601	1
27	ORING 202–511–4470	02450044	2

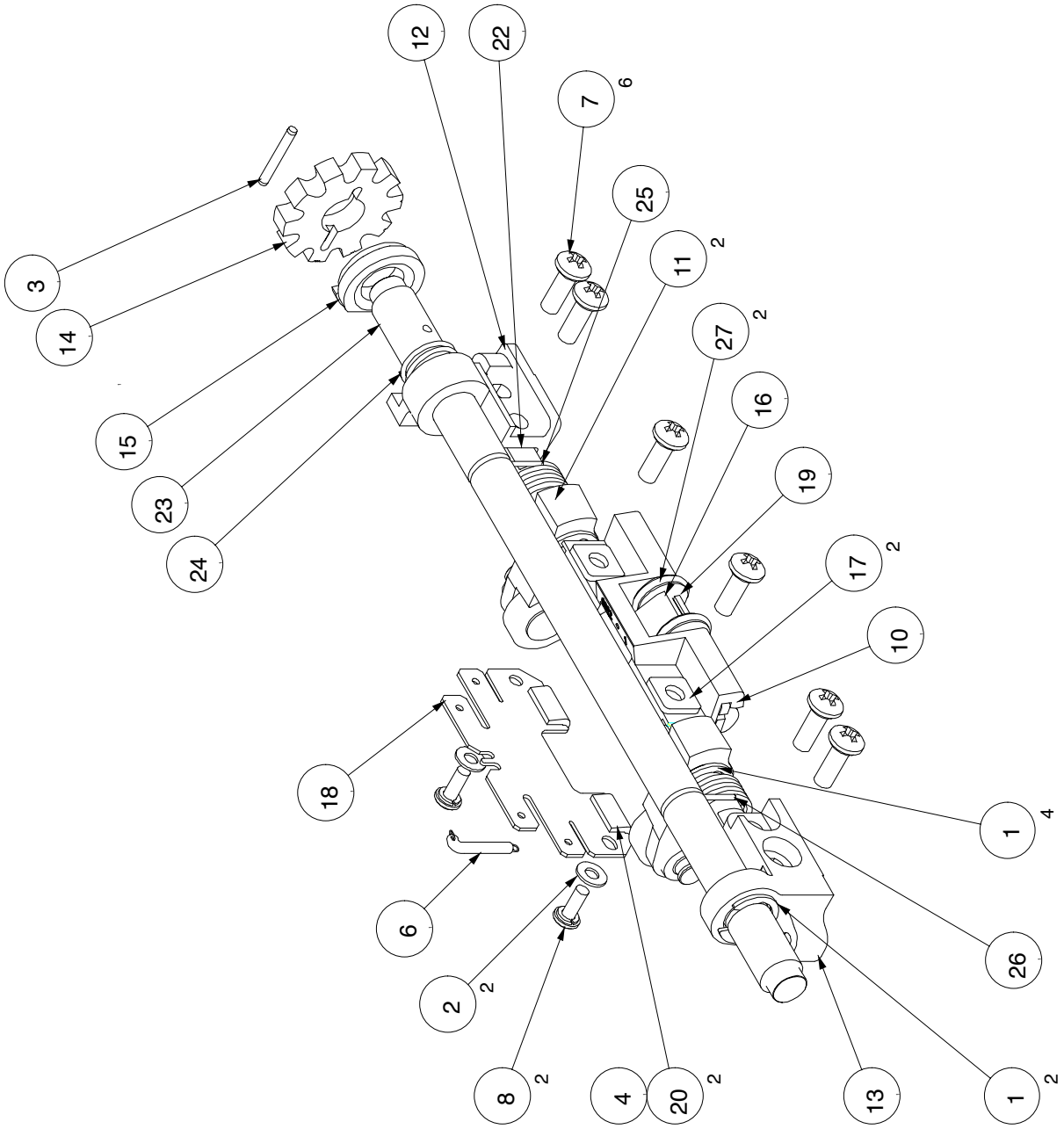

Figure 8. Separation Assembly

KEY TO FIGURE 9			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
141	CABLEFORM TRANSPORT SENSOR	2606000201	1
142	CABLEFORM CONTROLLER	2606000301	1
269	BELT–TIMING DISC PULLET IDLER	2614012201	1
469	2010 STACKER HOPPER B9 (MAROON)	2602315701	1
	2650 STACKER HOPPER B9 (BLUE)	2602315801	1
801	SCREW LN1441 K50X30	02460413	2
819	ORING (DOWTY) 81.92 X 5.34	02450051	1

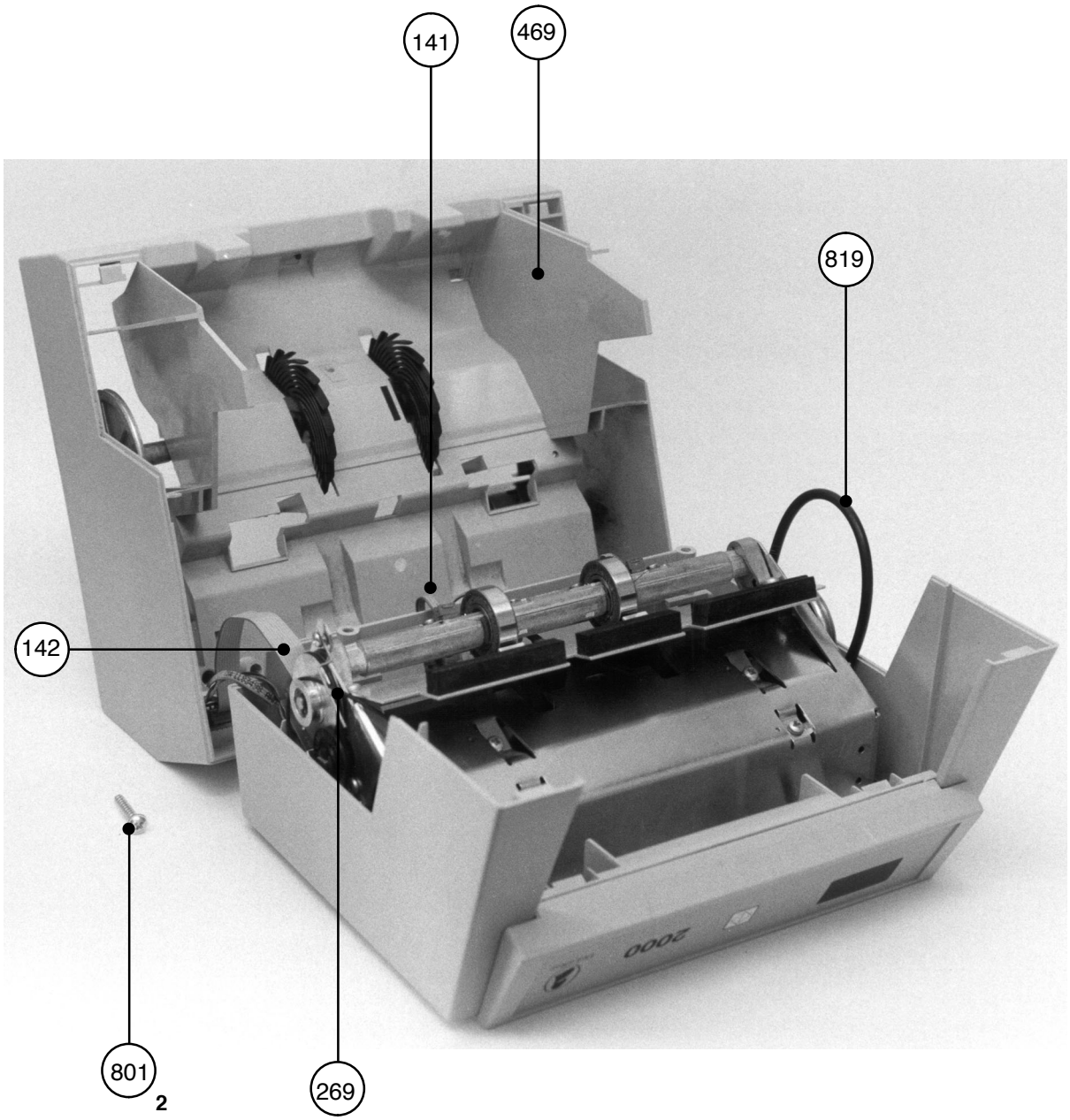

Figure 9. Machine Halves

KEY TO FIGURE 10			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
469	2010 STACKER HOPPER B9 (MAROON)	2602315701	1
	2650 STACKER HOPPER B9 (BLUE)	2602315801	1
506	CBLFM STACKER SENSOR B9	2606303602	1
615	2600 MOTOR CONTROL PCB KIT B8	2604534002	1
694	TRANSPORT MOTOR ASSEMBLY	2602006003	1
704	STACKER SHAFT SPARES	2602010201	1
786	ADHESIVE LOCTITE 406	00750079	1
801	SCREW LN1441 K50X30	02460413	3
824	STANDOFF RICHCO SRT – 3555B	02460406	2

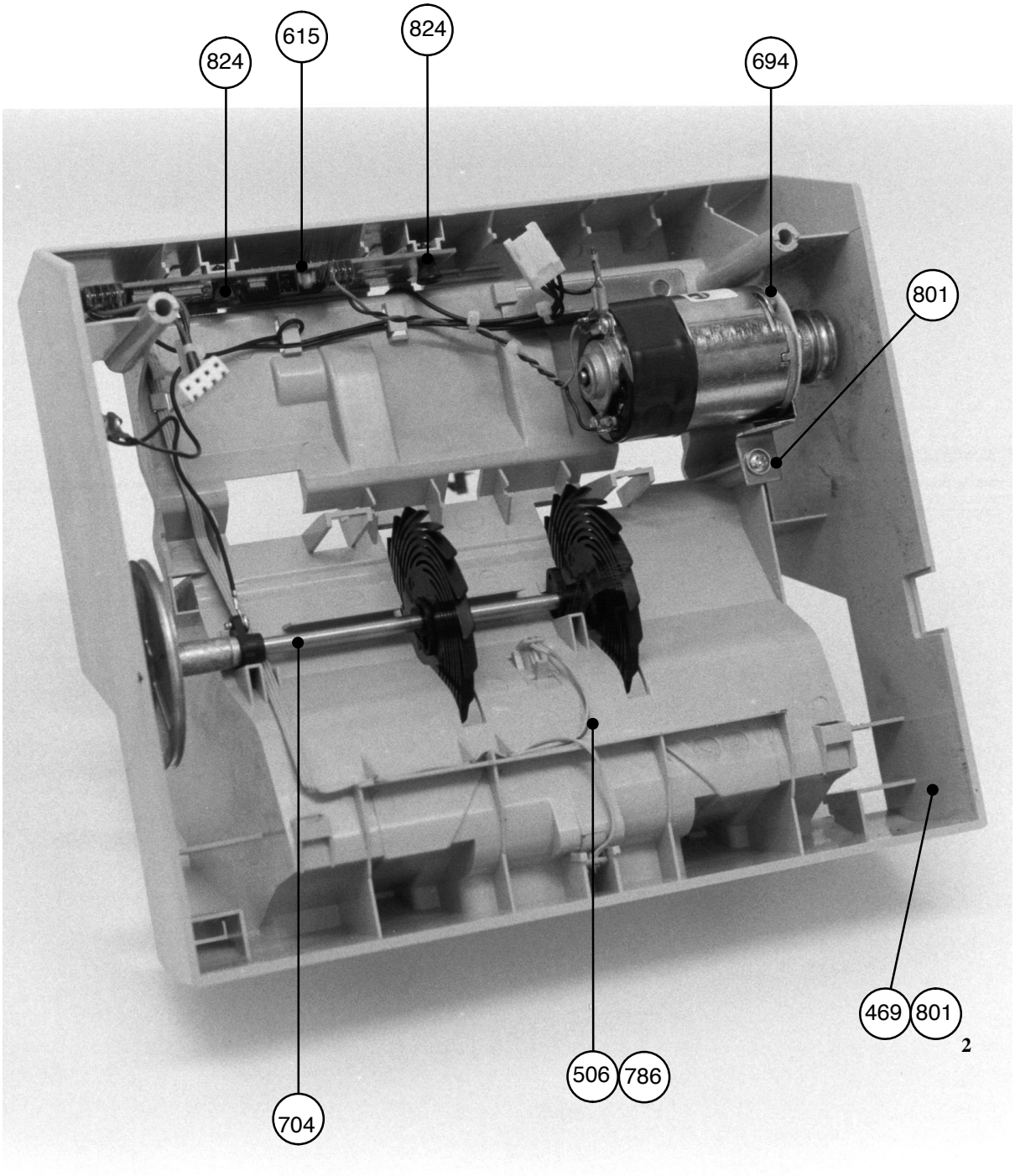

Figure 10. Stacker Hopper Assembly

KEY TO FIGURE 11			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
145	CABLEFORM FEED SENSOR	2606000601	1
247	PCBP FEED HOPPER SENSOR	2609530801	1
427	CBLFM LID OPEN SENSOR	2606004902	1
477	FEED SENSOR HOUSING	2614013504	1
579	2010 FEED HOPPER ASSY (MAROON) B9	2602314901	1
	2610 & 2650 FEED HOPPER ASSY (BLUE) B9	2602313801	1
	2610 & 2650 EURO FEED HOPPER ASSY (BLUE) B9	2602314101	1

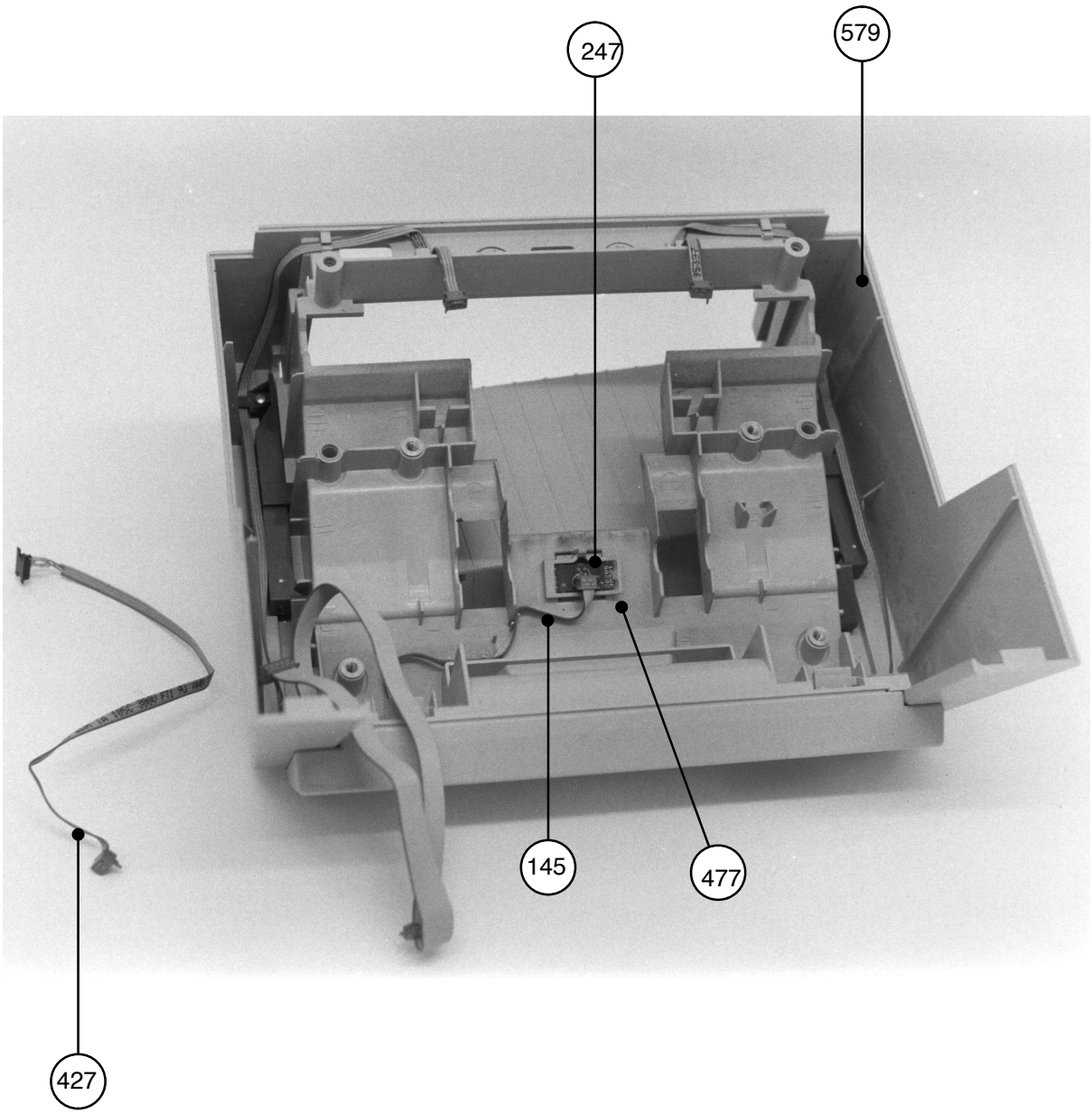

Figure 11. Feed Hopper Assembly

KEY TO FIGURE 12			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
416	CENTRAL SUPPORT UPPER	2614009004	1
417	CENTRAL SUPPORT LOWER	2614009102	1
821	SCREW M4X12 PAN POZI	02460343	4

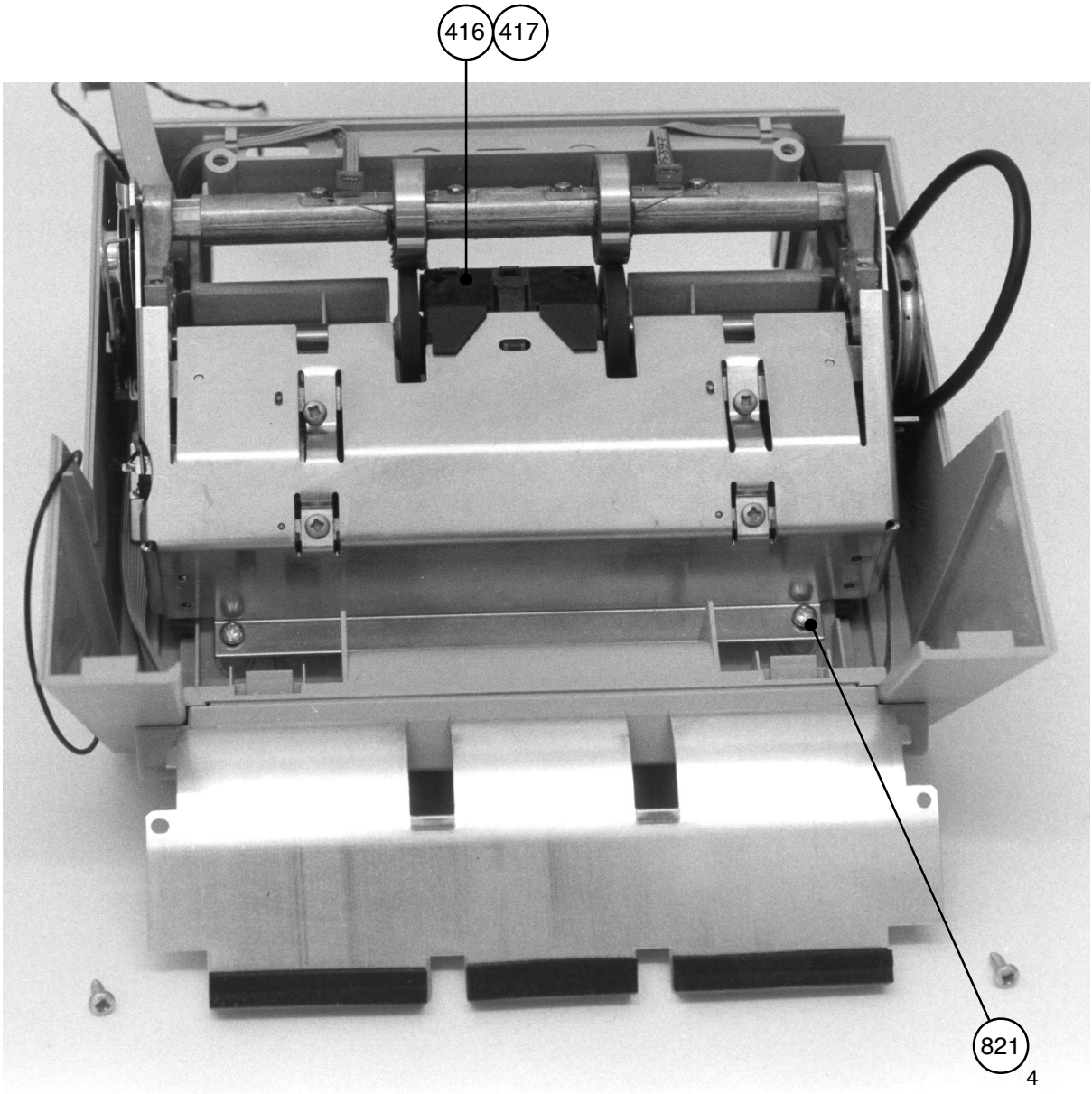

Figure 12. Feed Hopper Assembly

KEY TO FIGURE 13			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
142	CABLEFORM CONTROLLER	2606000301	1
269	BELT – PULLEY IDLER STKR PULLEY	2614012301	1
450	INTERNAL NOTE GUIDE	2616006201	1
557	CABLEFORM – DOUBLE DETECT	2606006401	2
579	2010 FEED HOPPER ASSY (MAROON) B9	2602314901	1
	2610 & 2650 FEED HOPPER ASSY (BLUE) B9	2602313801	1
594	PAD, ANTI–VIBRATION – OUTER	2620004901	2
595	PAD, ANTI–VIBRATION – INNER	2620005001	1
807	SCREW STAP M4 x 10 PAN POZI	00462915	2

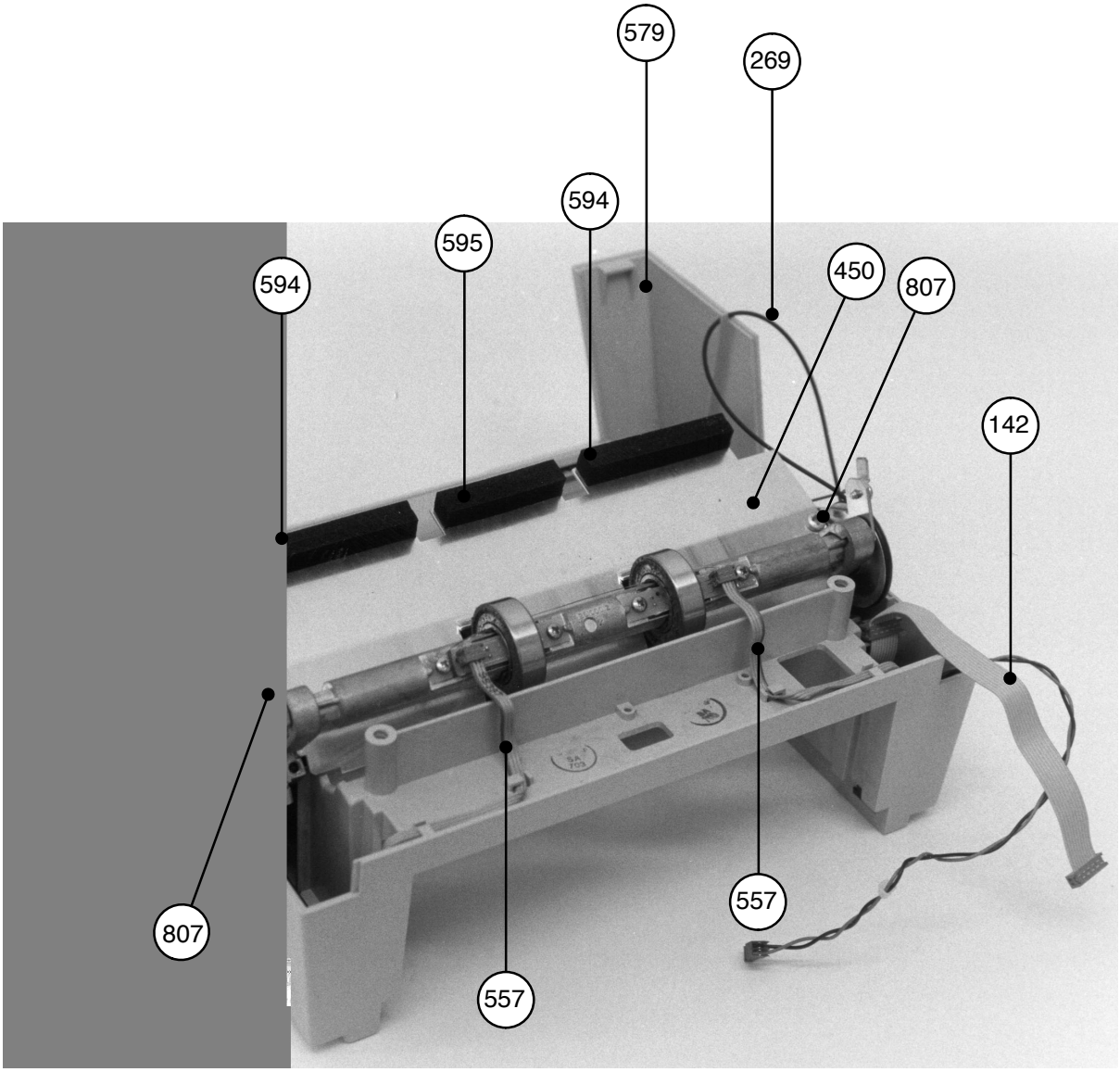

Figure 13. Feed Hopper Assembly

KEY TO FIGURE 14			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
33	DOUBLE DETECT ASSY	2602001202	1
266	PULLEY – STACKER IDLER	2610002102	1
267	TIMING DISC – PULLEY	2614012402	1
268	BELT–TIMING DISC–PULLEY IDLER	2614012201	1
414	GUIDE BELT BAIS	2643000501	1
445	CHASSIS, B9	2616007103	1
537	STUB AXLE	2620005203	1
619	PCBP TIMING WHEEL SENSOR – B8	2609536702	1
807	SCREW STAP M4X10 PAN POZI	00462915	4

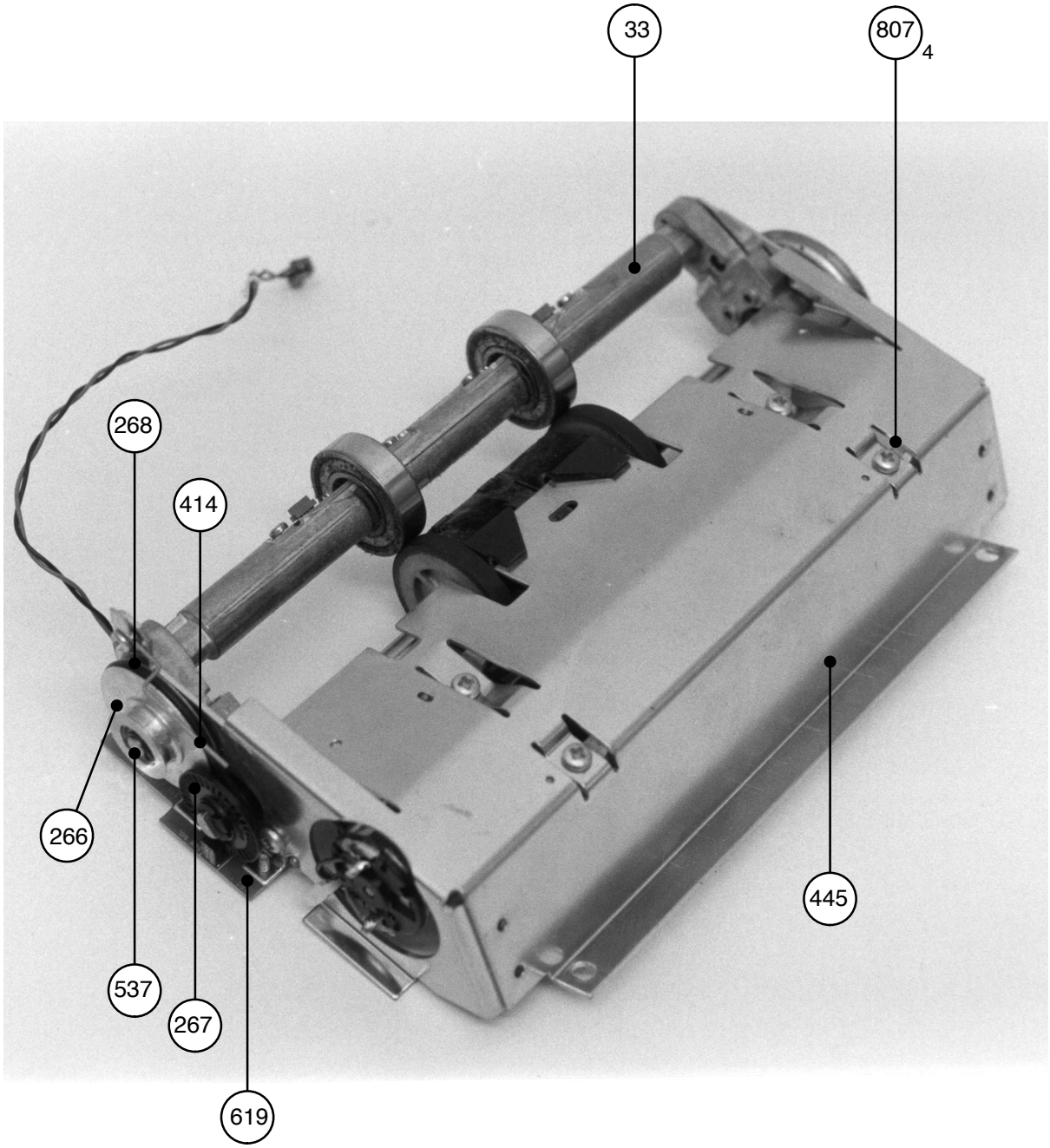

Figure 14. Chassis Assembly

KEY TO FIGURE 15			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
271	TRANSPORT PULLEY	2610000301	1
415	FEED BRG HOUSING	2610000705	2
418	FEED MOTOR ASSY – BUHLER B8	2602013201	1
619	PCBP TIMING WHEEL SENSOR – B8	2609536702	1
710	FEED SHAFT SPARES ASSY	2603001102	1
711	STRIPPER WHEEL SPARES ASSY	2602013101	1
712	TRANSPORT SHAFT SPARES ASSY	2602003104	1
807	SCREW STAP M4X10 PAN POZI	00462915	4
817	TIMING BELT MXL 62TX25 F260003	02280376	1
831	TYWRAP 92/102LG	00470401	1
880	SCREW M4X 6 GRUB SKT HTS BLU	00462107	1
919	ADHESIVE LOCTITE 222 10ML	00750002	1

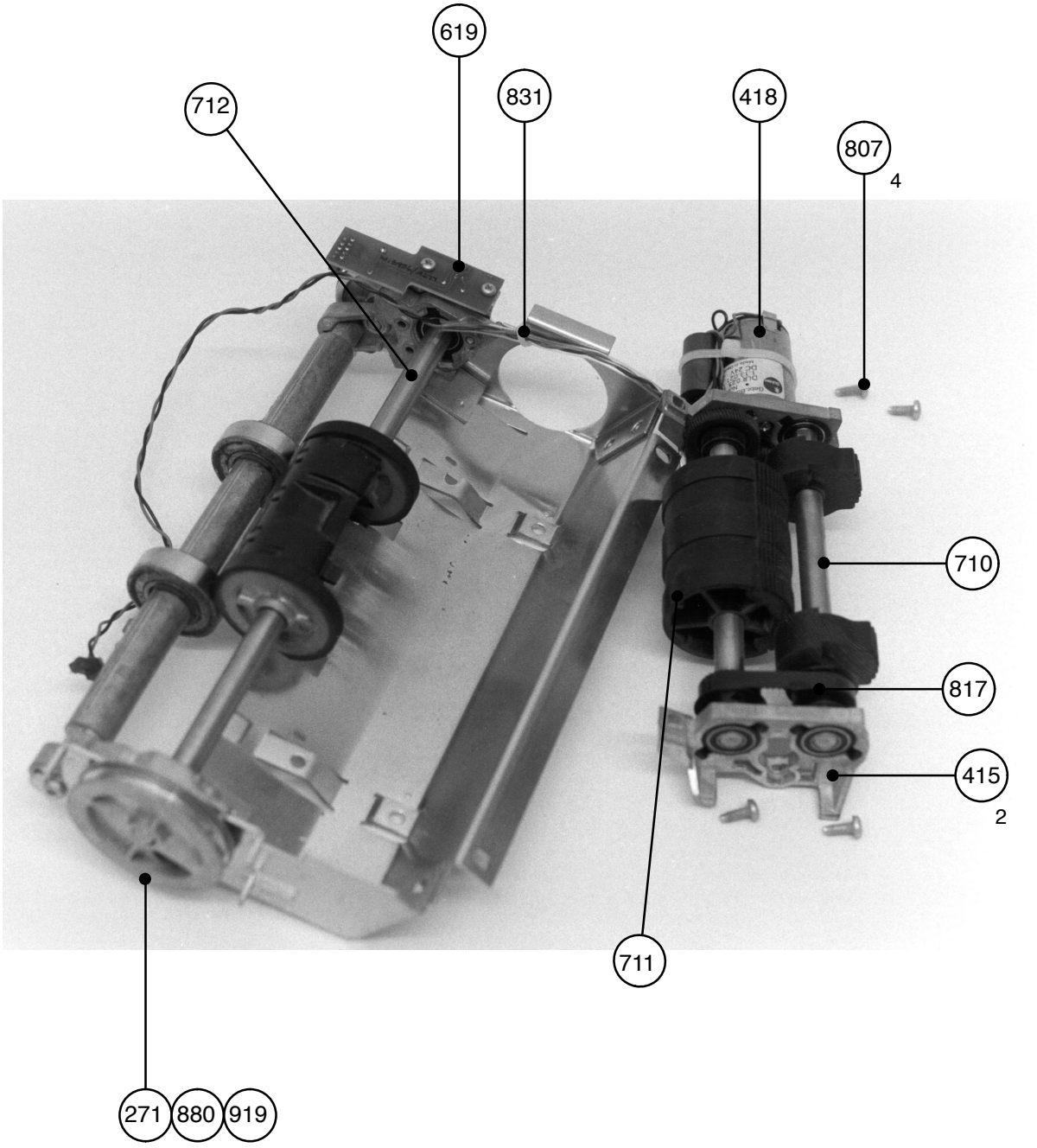

Figure 15. Chassis Assembly

KEY TO FIGURE 16			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
235	PCBP DOUBLE DETECT	2609530701	2
279	DOUBLE DETECT SHAFT	2610001204	1
349	DOUBLE DETECT PIN	2614002501	2
353	DOUBLE DETECT COLLAR	2614003001	2
532	DOUBLE DETECT SEAL	2620001201	2
809	BEARING BALL 17ID 35OD	02490105	2
810	SCREW 3 x 7.5mm POZI DRIVE	02460416	4
886	WIRE TIN COPPER 28AWG	02590537	1

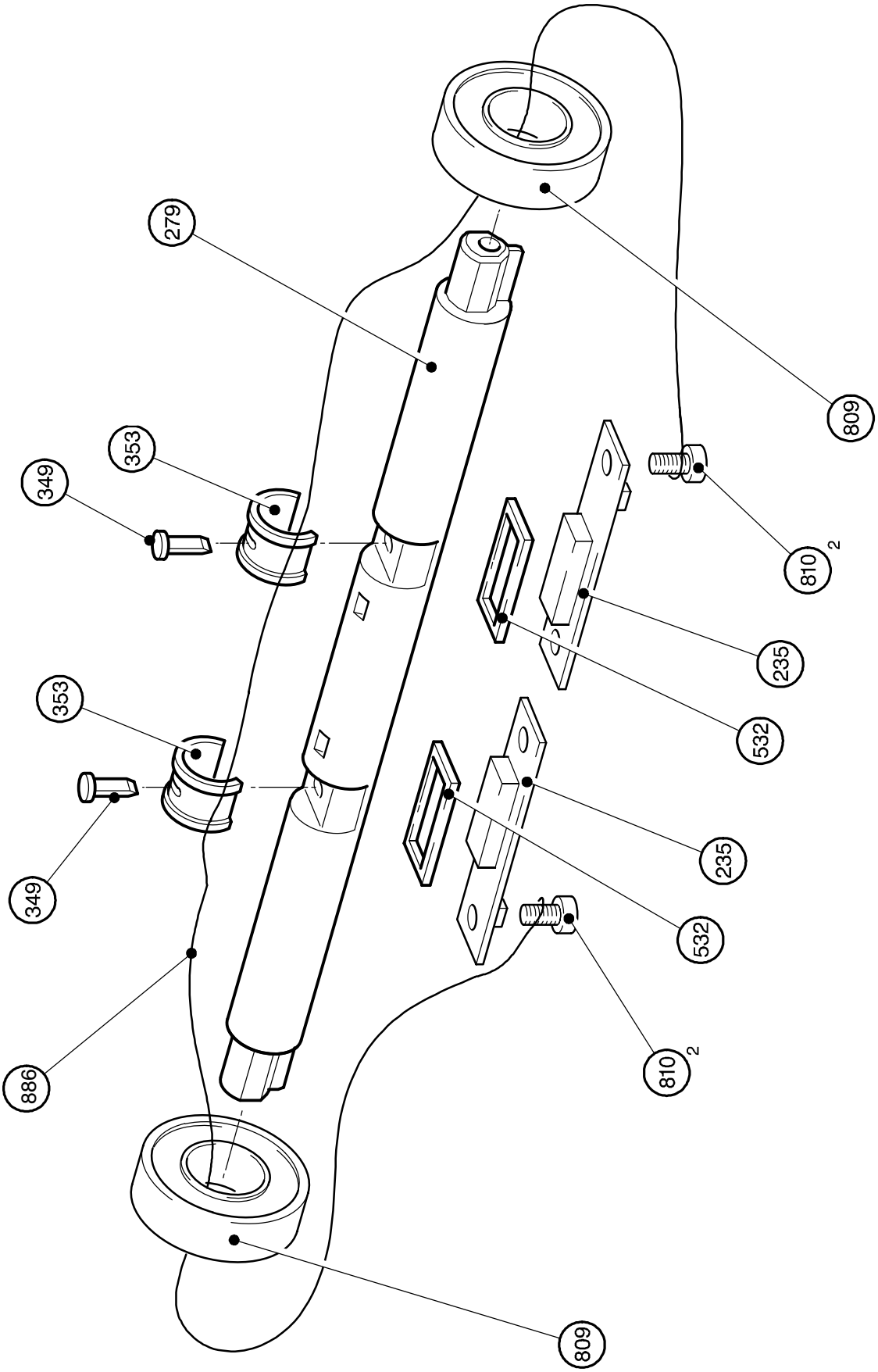

Figure 16. Double Detect Assembly (2602001202)

KEY TO FIGURE 17			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
250	2000 MAIN CONTROLLER PCB KIT	2604533604	1
604	SWITCH PANEL ASSEMBLY SPARES	2603003601	1

Note: Item 604 includes facia moulding, gasket and membrane panel as an assembly.

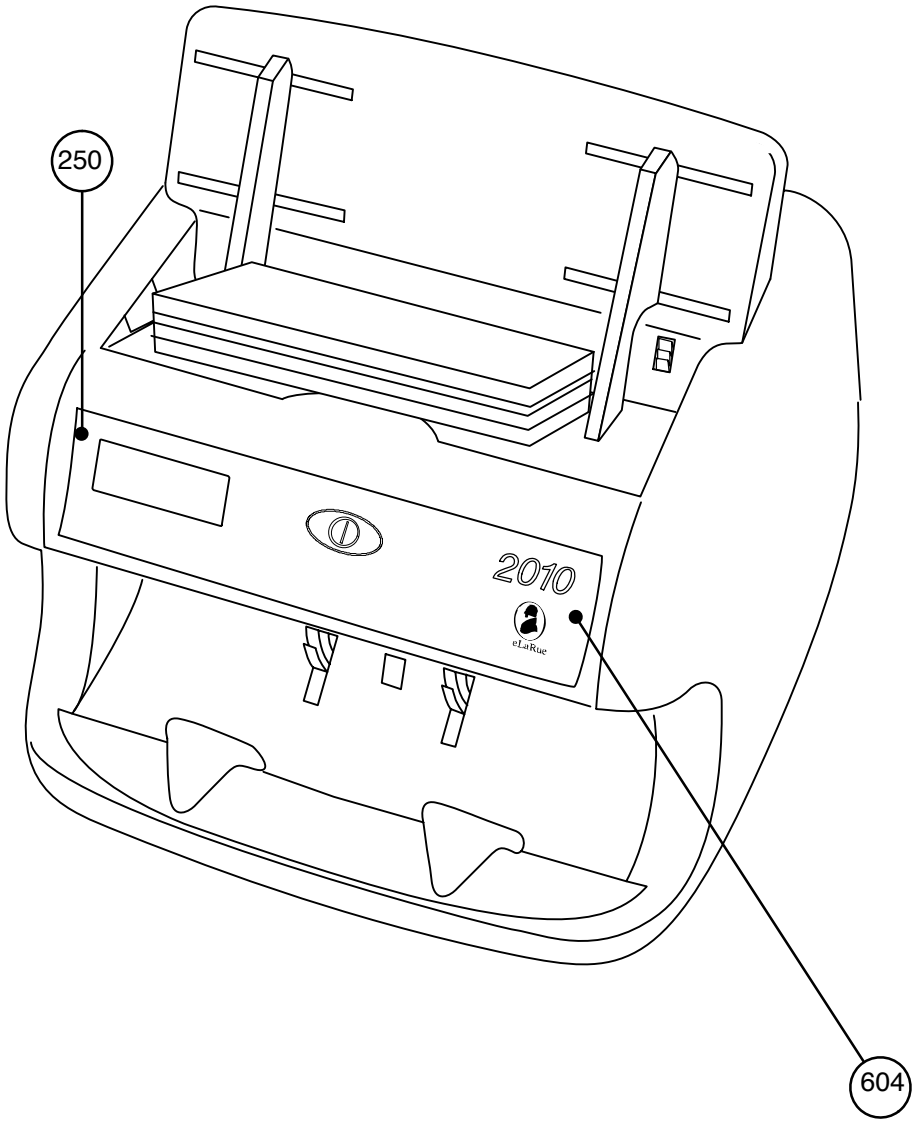

Figure 17. 2010 Overall View

Appendix 1

2610 Machine

(for 2610E see Appendix 3)

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1. INTRODUCTION

The 2610 range of machines are similar to the 2010 machine discussed in the main part of this manual. The majority of the description can be applied to the 2610 range with minor differences. These differences are highlighted in this appendix. A general view of the 2610 range is shown in Figure 1.

The machine is capable of being fitted with size detection (SD or 3D) or UV detection but not both. No value balance facility is available with the 3D variant.

2. MAIN SPECIFICATIONS

The mechanical and electrical specifications are as the 2010 machine with the following exceptions:

Note Counting Speed (Throughput rate)	Preset speeds of 1200, 1000 and 600 notes/min.
Display	A 5 digit count display plus 3 digit batch display.
Document Size Range	190mm x 90mm maximum 100mm x 50mm minimum if size detection is available: 170mm x 90mm maximum 120mm x 50mm

For note sets with the largest note smaller than or equal to 160mm, a 2610E may be more suitable.

KEY TO FIGURE 1			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
496	B8 2600 NOTE GUIDE SUPPORT	2614011903	1
571	2600 NOTE GUIDE D/A BLUE L/H	2602313501	1
572	2600 NOTE GUIDE D/A BLUE R/H	2602313401	1
605	SWITCH PANEL SPARES – 2610 B9	2603003701	1

Note: Item 605 includes facia moulding, LCD gasket and switch panel as an assembly.

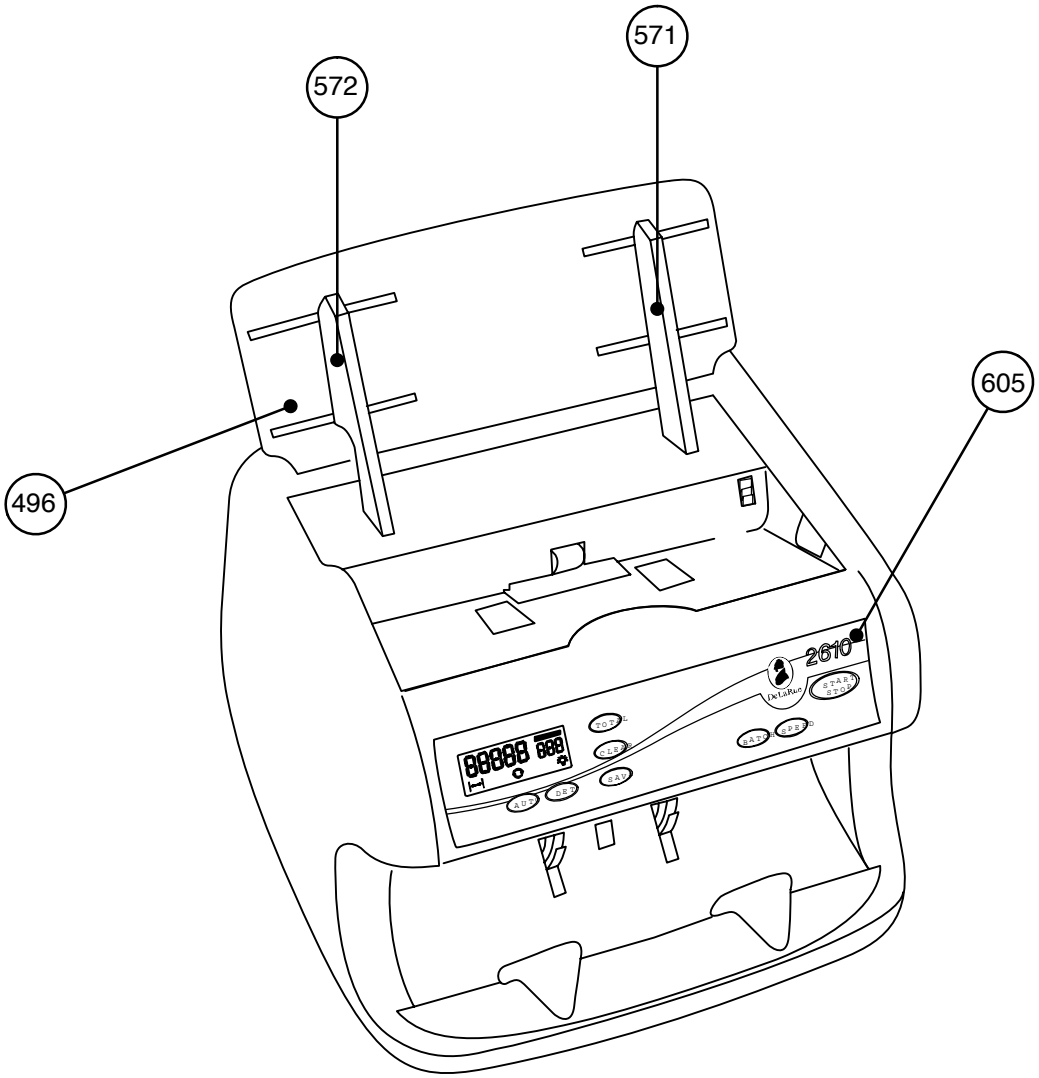
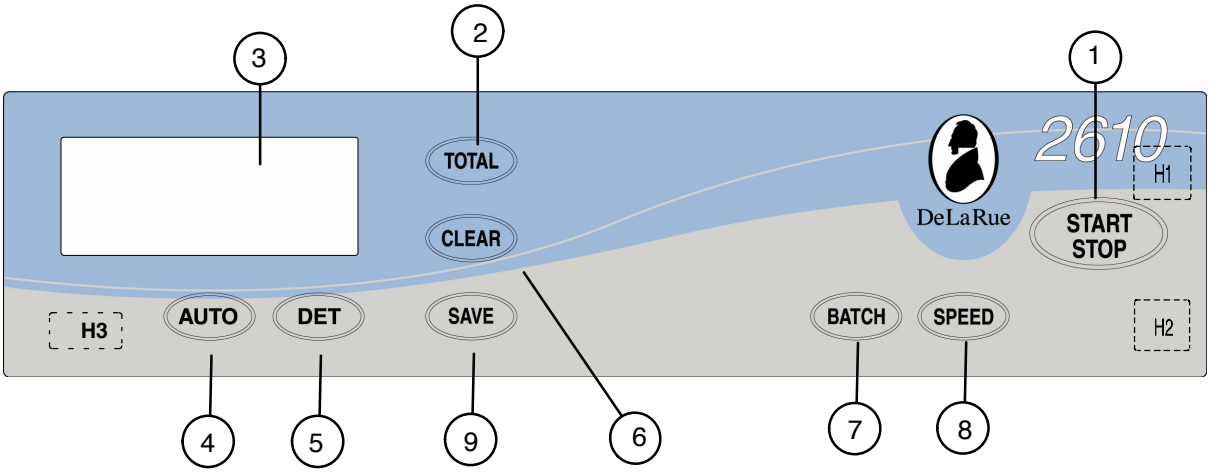


Figure 1. 2610 Banknote Counter General View

3. CONTROLS AND MODES OF OPERATION

***** The function of these keys and corresponding symbols are dependent upon the feature being fitted.



1	**Start/Stop**	
2	**Total**	Displays total of notes counted
3	**Display**	
4	**Auto**	Enables/disables automatic start
5*	**Det**	Enables either size or UV detection
6	**Clear**	Clears display
7	**Batch**	Set batch size, press to step through preset batch sizes
8	**Speed**	Set throughput speed, press to step through preset sizes
9	**Save**	Save new batch sizes to memory
H1, 2,3		Hidden keys used for selecting diagnostics, full details available in paragraph 7

Note: 2610 machines can be fitted with either size detection or UV detection, but not both.

Full details of controls and modes of operation can be found in the users guide in Appendix 5 of this manual.

4. MECHANICAL DESCRIPTION

The mechanical description is identical to that given in Section 2 of the main manual, the only difference being that of the facia assembly.

5. ELECTRICAL DESCRIPTION

The electrical description is identical to that given in Section 3 of the main manual with the following differences:

- The main controller PCB provides an interface to optional detectors.
- The front panel display comprises a 5 digit count display plus a 3 digit batch display.
- The keypad is of membrane construction with a matrix of 21 keys (7 columns by 3 rows). The key layout is shown in paragraph 3.

SK5 – Membrane

Pin No	Remarks
1	Column 7 out
2	Column 6 out
3	Column 5 out
4	Column 4 out
5	Column 3 out
6	Column 2 out
7	Column 1 out
8	Row 3 in
9	Row 2 in
10	Row 1 in

An interconnection diagram for the 2610 range of machines is shown in Figure 2.

6. ERROR MESSAGES

Error messages displayed during machine operation include rEP, dEn, CF, FAUlt, JA, CLEAr, HALF, Err Prt, GULP, FEEd, CLEAn, UnCAL, Found, ibuS, CnS, Error and Lid. When some of these messages are displayed additional information about the type of error can be obtained by pressing the H1 key. To display the number of correctly counted notes prior to the error occurring press the H2 key.
See Appendix 13 for details.

7. DIAGNOSTICS

Entry into engineer diagnostics is achieved by pressing and holding hidden key H1 then pressing hidden key H3. Pressing the hidden key to the left of the AUTO key returns the machine to normal operation. On entry into machine diagnostics, the following is shown on the count display:

‘tESt’	–	for 1 second
‘xxxx’	–	software version/revision for one second
‘dn1’	–	diagnostics mode 1

The machine is now in the diagnostic select mode.

To select a particular diagnostic mode press the hidden keys H1 or H2 for the required number.

The START key is used to enter the diagnostic mode selected and the hidden key (H3) to the left of the AUTO key is used to exit from the diagnostic mode.

Note that if the machine exits from diagnostic mode with uncalibrated detectors the display will show ‘UnCAL dEt’.

Diagnostic modes which require the use of numeric entries make use of the hidden keys and the BATCH key to adjust the value on the display. The displayed value is incremented by pressing the H1 hidden key and decremented by pressing the H2 hidden key.

7.1 Diagnostic 0 – CRC, Version and Revision Numbers

Diagnostic mode 0 displays the CRC, Version and Revision numbers. On entry into this diagnostic mode the display shows the software version and revision. The CRC is displayed by pressing the SAVE key.

To exit base diagnostics press hidden key H3.

7.2 Diagnostic 1 – Sensor Check

Diagnostic mode 1 allows the operation of the following sensors to be checked:

- Stacker
- Transport
- Feed
- Doubles Detect (left)
- Doubles Detect (right)

On entry into this diagnostic pressing the START key twice will run the transport at 1000 npm with the COUNT display showing '– – – – –' with no notes being fed, and with a correctly working machine.

If the stacker, transport and feed sensors are blocked then unblocked in succession the display will change to '_ – – – –', '– _ – – –', '– – _ – –' and then back to '– – – – –' if all the sensors are working correctly.

If there is a fault or lack of correct calibration on either of the doubles detectors the display will show '– – – _ –' or '– – – – _' for the left and right detectors respectively. With the machine in this state, pressing the AUTO or DET keys will display the offset values in the 4th and 5th character locations on the display for the left and right doubles detectors respectively.

Press the STOP key.

If a fault or lack of calibration is indicated the detector should be recalibrated prior to further diagnosis of the fault (see paragraph 7.3).

Press the hidden key to the left of the AUTO key to exit.

7.3 Diagnostic 2 – Auto Double Detect Setting

Diagnostic mode 2 allows the doubles detect gain to be set automatically as follows:

When this mode is entered the display will show 't – –'. Place a pack of test notes* (149 x 80mm – Part No. 02390166) in the feed hopper and press the START key to start the setup cycle. The machine will feed 10 notes, make it's own adjustments and then feed another ten notes. The cycle will continue until either the machine runs out of notes or 3 consecutive batches of 10 are measured correctly within limits. The display shows 'y – –' where y is the number of batches of

10 with double detect in limits (0, 1, 2 or 3). The middle digit is the LHS double detect indicator and the right digit is the RHS double detect indicator. The middle bar is lit when the double detect is within limits. If the double detect is greater than the upper limit the top bar will be lit and if the double detect is below the lower limit then the bottom bar will be lit.

* The test document is used in preference to an actual banknote due to its consistent note thickness. Using the incorrect document may result in an increased stop rate.

If an out of limits error occurs then the indicator for that double detect will flash.

To exit to base diagnostics block the stacker sensor and press the SIZE Key.

Note: Diagnostic 3 and 4 are used to define the maximum and minimum short edge note sizes that will be accepted when in an auto size mode (non value count or denom entry value mode), when the note size table is not in use. In effect they set the tolerance of the acceptable note size based on the first note counted in each batch.

7.4 Diagnostic 3 – Autosize Lower Limit (short edge) (SD machine only)

Diagnostic mode 3 sets the size lower limit (short edge dimension). When the mode is entered the display shows 'xxx Ent'. Key in the required limit using hidden keys H1 and H2 (maximum 3 digits). The display shows the limit in tenths of a millimetre (i.e. 10 is equivalent to 1.0mm, 105 is equivalent to 10.5mm). The default is 30 (i.e. –3.0mm).

Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press hidden key H3 to exit.

7.5 Diagnostic 4 – Autosize Upper Limit (short edge) (SD machine only)

Diagnostic mode 4 sets the size upper limit (short edge dimension). When the mode is entered the display shows 'xxx Ent'. The size is input as detailed in paragraph 7.4. The default is 20 (i.e. +2.0mm). Press hidden key H3 to exit.

Note: The values obtained in Diagnostic 3 and 4 are saved in non volatile memory and hence are retained when the machine is powered down.

7.6 Diagnostic 6 – Size Detector Calibration (SD machine only – short edge dimension)

Note: Diagnostic mode 16 must be carried out prior to calibration.

Diagnostic mode 6 is used to display the average note length measured by the size detector, and adjust/calibrate the scale offsets in the size detector novram.

The COUNT display indicates the average right hand side note length measured by the size detector in the counted bundle (in tenths of a millimetre), and the BATCH display indicates the average left hand side note length.

Note these dimensions. The displays can be changed to show the overall average note length on the COUNT display and the number of notes counted on the BATCH display.

In diagnostic mode 6 the key functions are:

START – Clears any displayed errors and starts the machine if notes are in the feed hopper.

H1 – Sets the mode of operation so that the COUNT display shows the LHS average note length and the BATCH display shows the RHS average note length. In this mode the BATCH bar is OFF.

H2 – Sets the mode of operation so that the COUNT display shows the overall average length and the BATCH display shows the number of notes counted. In this mode the BATCH bar is ON.

BATCH – Displays the minimum and maximum measured note lengths measured on the LHS and RHS size detector when the BATCH key is repeatedly held pressed. The COUNT display shows the minimum, and BATCH display shows the maximum.

AUTO – Selects/deselects the auto–start count mode indicated by the AUTO icon.

DET – Allows the size detector LHS and RHS scale offsets to be adjusted in novram, using the average length measured from a counted bundle of notes, together with an entered value for the actual note length. The procedure is as follows:

a. When the mode is entered, press the H1 key (bar over batch display disappears). Load notes into the feed hopper (of known size, between 75 and 90mm, to ± 0.2mm) and press START.

b. Press and hold the BATCH key. Check that both measurements displayed are within ±1.0mm of the RHS average recorded above. Release the BATCH key. Press and hold the BATCH key. Check that both measurements displayed are within ±1.0mm of the LHS average recorded above. Release the BATCH key. Proceed only if the machine passes this test. (If the sizes displayed are outside the tolerance specified, check the calibration notes for edge damage, remove from the pack and repeat the test).

c. To adjust the size detector scale offset press the DET key (display shows ‘EntEr LEn’) and then use hidden keys H1 and H2 to enter the specified short edge dimension of the test document onto the COUNT display (in tenths of a millimetre).

d. Once the correct length has been entered press the START key and the display will change to show ‘buSy’ while the scale offsets are being calculated and saved in the size detector novram, followed by ‘donE’ when it is completed.

e. Reload the calibration notes and press the START key to count the notes again and check the average RHS and LHS lengths

obtained with the adjusted scale offsets. (Satisfactory if measured length is within ± 0.2mm of actual dimension).

f. Repeat this process of feeding calibration notes and checking the measured dimension until it is within ± 0.2mm of actual dimension.

g. Press hidden key H3 to exit.

7.7 Diagnostic 7 – Set Size Detector Control (SD machines only)

Diagnostic mode 7 allows the grade of size detection to be changed. When the mode is entered the display shows 'dt_x', where x = 1 or 2:

x = 1	The larger of the two sensor readings is required to be within limits (default setting).
x = 2	Both sensor readings are required to be within limits.

The BATCH key is used to toggle the display between 'dt1' and 'dt2'.

The detection level grade is not normally stored in non volatile memory and hence will be reset to the default value if the machine is reset (i.e. x = 1). However, if the START key is pressed at this point, the new grade will be stored in NOVRAM.

Press hidden key H3 to exit.

7.8 Diagnostic 9 – View Output and Calibrate UV Detector

Diagnostic mode 9 is used to check the operation of the UV detector and to calibrate it. The BATCH display indicates the total number of notes counted in the bundle. The COUNT display indicates the number of notes counted having a UV presence level above the threshold (set to 10). The COUNT display can be changed to show the UV presence level for each note as it is counted.

In diagnostic mode 9 the key functions are:

START	– Clears any displayed errors and starts the machine if notes are in the feed hopper.
TOTAL	– Displays the total number of UV presences for the last bundle of notes counted.
H1	– Sets the mode of operation so that the COUNT display shows the UV presence level for each note as it is counted. In this mode the BATCH bar is ON.
H2	– Sets the mode of operation so that the COUNT display shows the number of notes counted having UV presence level above the threshold. In this mode the BATCH bar is OFF.
BATCH	– Displays the maximum and minimum UV presence level obtained from a note in the last bundle when the BATCH key is repeatedly held pressed. These are indicated with either 'Hi' or 'Lo' displayed on the batch display for the maximum and minimum presence levels.
SPEED	– Displays the average UV presence level for the notes in the last bundle.

AUTO – Selects/deselects the auto–start count mode indicated by the AUTO icon.

DET – Selects the UV detector calibration mode, which is used to calibrate the UV signal and reference amplifier digital potentiometer settings as follows:

Note: The UV detector calibration sequence should only be carried out when the machine has been powered up for at least two minutes.

a. On entering the UV detector calibration mode the display will show 'EntEr doC', which is a prompt to insert a calibration document (02390145 – Calibration Document (Calibrated)) into the machine in front of the UV detector.

Note: The calibration document should be stored in the dark and only exposed to light for short periods whilst calibrating the machine. Failure to comply with this can affect document calibration.

b. To insert the calibration document open the detector box and place the calibration document below the UV detector window. Close the detector box.

c. Enter the UV calibration level for the document, printed on the document, using the hidden keys 'H1' and 'H2', and then press the START key.

d. The display will show 'buSY' while the UV calibration is in progress, followed by 'donE' when it is completed.

e. Pressing the H1 key enables the UV reference amplifier potentiometer setting ('reF'), the signal amplifier calibration level ('CAL') and signal amplifier potentiometer ('dEt') setting to be displayed. The parameters are displayed in sequence by pressing the START key, the display will show 'donE' at the end of the sequence.

f. The UV calibration mode is terminated by removing the calibration document and pressing the START key.

g. The UV amplifier potentiometer settings are retained in the main controller NOVRAM and are used to set up the UV detector when it is initialised.

h. Press hidden key H3 to exit.

7.9 Diagnostic 13 – Cycling of Motors

Diagnostic mode 13 cycles the machine motors as if batching 100 notes, continuously. It is not intended for heavy use which would result in rapid wear occurring.

Press the START/STOP key to start or stop the cycle and select 'AUTO' for continuous operation.

FO, tO indicates feed and transport motors off, F1, t1 motors on. Press hidden key H3 to exit.

7.10 Diagnostic 14 – Initialise Non Volatile Memory

Entry into diagnostic mode 14 sets the non volatile memory to the default values. Press the START key, the display will show 'SEt'. Press the START key again, the display will show 'donE'.

If the machine is unable to set the non volatile memory, the display shows ‘FAIL’.

Press hidden key H3 to exit.

Note: This diagnostic resets the Doubles Detector and detector calibration (UV) settings,use diagnostic 2 before returning machine to service, and re–calibrate the detector.

7.11 Diagnostic 15 – Set Count Speed

*Note: This diagnostic sets the transport speed, **not** the throughput rate. A throughput rate of 1500 n.p.m. is equivalent to a transport speed of approximately 1800 n.p.m.*

Diagnostic mode 15 enables the note count speed to be altered. When the mode is entered, the COUNT display shows the note count speed in notes per minute (npm). The speed is changed by entering the required speed using hidden keys H1 and H2 (valid range 400 to 2500 npm). The displayed speed is increased or decreased in steps of 50 (or steps of 500 with the BATCH key held pressed). On exit from this diagnostic (using hidden key H3) back to base diagnostics, further diagnostic functions will run at the selected speed.

Pressing hidden key H3 again, to exit to normal operation, will reset the speed to that on entry to the diagnostics.

7.12 Diagnostic 16 – Initialise Size Detector Non Volatile Memory

Note: This diagnostic mode must be carried out prior to calibration (diagnostic mode 6).

On entry into diagnostic mode 16 the machine will display ‘rEAdY’. On pressing the START key the machine will display ‘buSY’ and then ‘donE’ when the initialisation is complete (or ‘FAIL’ if unsuccessful). Pressing hidden key H3 will then exit from the diagnostic.

Note: This diagnostic resets size parameters and clears the size/denomination table. It may take 10 seconds to complete this initialization.

Note: Diagnostic 23 and 24 are used to define the maximum and minimum long edge note sizes that will be accepted when in an auto size mode (non value count or denom entry value mode), when the note size table is not in use. In effect they set the tolerance of the acceptable note size based on the first note counted in each batch.

7.13 Diagnostic 23 – Autosize Lower Limit (3D machines only – long edge lower limit)

Diagnostic mode 23 sets the size detector lower size limit (long edge dimension). When the mode is entered the display shows ‘Ent’. Key in the required limit on the keys 0 – 9 (maximum 3 digits). The display shows the limit in tenths of a millimetre (i.e. 10 is equivalent to 1.0mm, 105 is equivalent to 10.5mm). The default is 40 (i.e. –4.0mm).

Once the correct autosize limit has been entered, press the START key. The display will change to show ‘buSy’, followed by ‘donE’ when the machine update has been completed. Press the SIZE key to exit.

7.14 Diagnostic 24 – Autosize Upper Limit (3D machines only – long edge upper limit)

Diagnostic mode 24 sets the 3D size detector upper size limit (long edge dimension). When the mode is entered the display shows 'Ent'. Key in the required limit on the keys 0 – 9 (maximum 3 digits). The display shows the limit in tenths of a millimetre (i.e. 10 is equivalent to 1.0mm, 105 is equivalent to 10.5mm). The default is 30 (i.e. 3.0mm).

Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press the SIZE key to exit.

7.15 Diagnostic 45 – Totals Stored in NOVRAM

Diagnostic 45 allows the background totals stored in novram to be displayed. On entry into diagnostic mode 45 the machine will display the total number of notes counted. Use the START key to step through the other totals:

Total notes

Total rEPs (repeated notes in stacker)

Total DF's (detector errors – machines fitted with additional detectors only)

Total dEn's (size error detections)

Total jams

The NOVRAM totals can be reset by pressing and holding the TOTAL key and then pressing the CLEAR key.

Press hidden key H3 to exit.

7.16 Supervisor Mode

There is one supervisor mode available which is used for changing the fixed batch size entries. To enter the supervisor mode press and hold the TOTAL key and then press the BATCH key.

On entry into the supervisor mode the display will flash the 'batch bar' together with the least significant digit in the batch display. Use the START key to increment the digit from 0 to 9. When the required number is displayed press the SPEED key to select the next left hand digit. Use the START key to increment the digit until the required number is displayed. Press the SPEED key to select the most significant digit and then use the START key to select the required number.

Press the BATCH key to select the next batch size for change.

To exit supervisor mode press the TOTAL key. The machine will operate with the changed batch sizes but the batch sizes stored in novram are not affected.

If the SAVE key is pressed instead of the TOTAL key the changed batch sizes are saved in novram.

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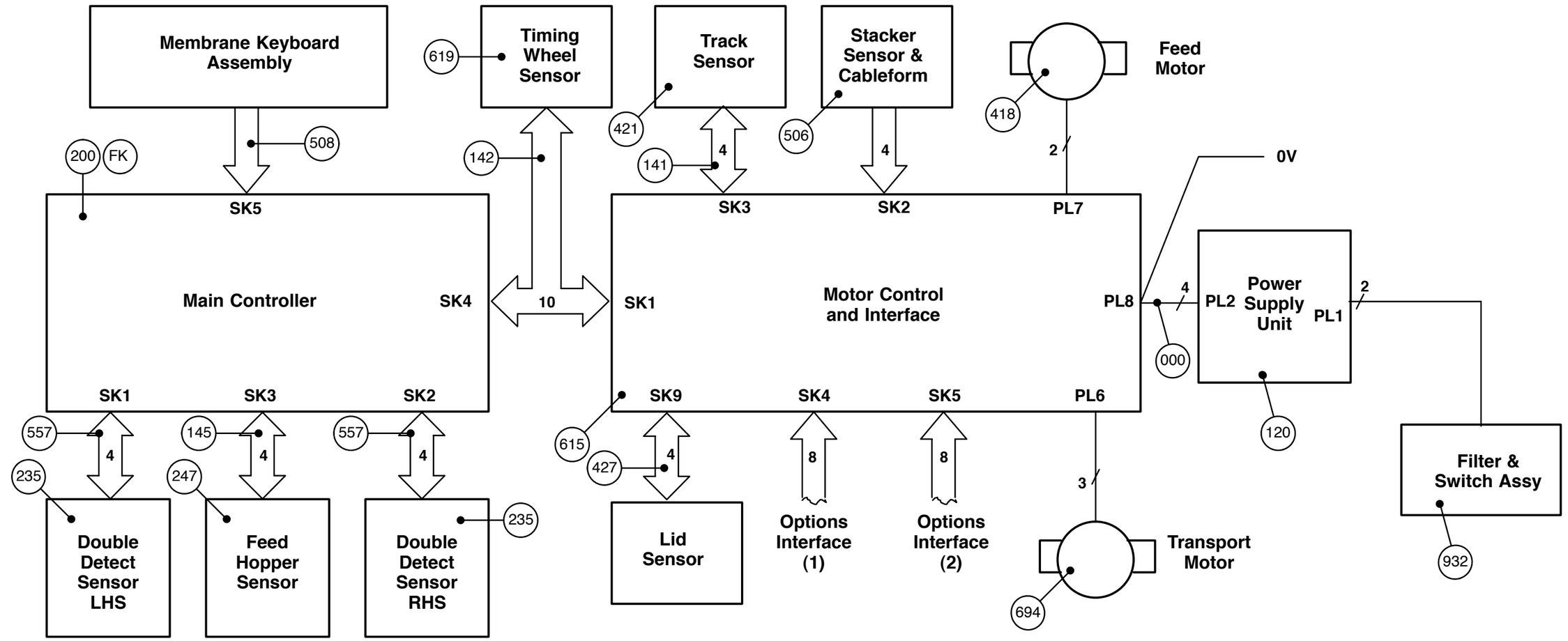

ITEM	DESCRIPTION	PART No.
120	PSU	02620415
141	Transport Sensor Cableform	2606000201
142	Main Controller Cableform	2606000301
145	Feed Sensor Cableform	2606000601
200	2600 B8 Main Controller PCB Kit	2604536503
FK	2610 S/W	FK002722/03
235	PCBP Double Detect	2609530701
247	Feed Hopper Sensor PCB	2609530801
418	Feed Motor Assy – Buhler B8	2602013201
421	PCBP Ref Track Sensor	2609535504

ITEM	DESCRIPTION	PART No.
427	Cableform, Lid Open Sensor	2606004902
506	Cableform Stacker Sensor B9	2606303602
508	2610 Membrane Panel Assembly	2603003701
557	Doubles Detect Cableform	2606006401
615	Motor Control PCB Kit	2604534002
619	Timing Wheel Sensor PCB	2609536702
694	Transport Motor Kit	02510186
932	Filter & Switch Assembly	2606303705
000	Cableform, PSU – A.B. Motor Control	2606006201

ITEM	DESCRIPTION	PART No.
	Cordset Euro–Plug	02540414
	Cordset USA–Plug	02540415
	Cordset UK–Plug	02540516
	Cordset Australia/N.Z. – Plug	02540550
	Cordset India/S. Africa – Plug	02540630
	Cordset Israel – Plug	02540902

Figure 2. 2610 Interconnection Diagram

Appendix 2

2650 Machine

(for 2650E see Appendix 3)

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1. INTRODUCTION

The 2650 range of machines have similarities with the 2010 and 2610 machines covered in other sections of this manual. The differences between the 2650 range of machines and other 26xx machines are detailed in this appendix.

All machines in the 2650 range have:

- Fully variable speed control up to a maximum of 1500 notes per minute (throughput speed).
- Fully variable batching up to 999.
- Automatic and manual start/restart.
- 5 digit count display plus 3 digit batch display.
- Count with total facilities.
- Document thickness detector for identifying double, triple and overlapped notes.
- Value counting.

1.1 Options

The machine is capable of being fitted with the following options :

- Size detection (short dimension and doubles), SD
- Size detection (short and/or long dimensions and doubles), 3D
- EMG detection (single head).
- Ultra Violet (Bright) detection (for photocopy paper detection).
- RS232 type serial interface(s). (CMS – Cash Management System)

Note: The detectors may be fitted in any combination. The 3D size detector includes SD capability.

2. MAIN SPECIFICATIONS

The mechanical and electrical specifications are as the 2010 machine with the following exception:

Note Counting Speed (Throughput rate)	1500 notes/min (Variable between 600 and 1500 notes/min in steps of 100 notes/min in 4 preset values).
Display	A 5 digit count display plus 3 digit batch display.
Stacker Capacity	200 notes max (programmable).

KEY TO FIGURE 1			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
426	FEED HOPPER ASSEMBLY BLUE B9	2602311401	1
496	B9 2600 NOTE GUIDE SUPPORT	2614016001	1
571	2600 NOTE GUIDE D/A BLUE R/H	2602313401	1
572	2600 NOTE GUIDE D/A BLUE L/H	2602313501	1
606	SWITCH PANEL SPARES –2650 B9	2606303901	1

Note: Item 426 includes actuators, latches and warning label.

Note: Item 606 includes facia moulding, LCD gasket and switch panel as an assembly.

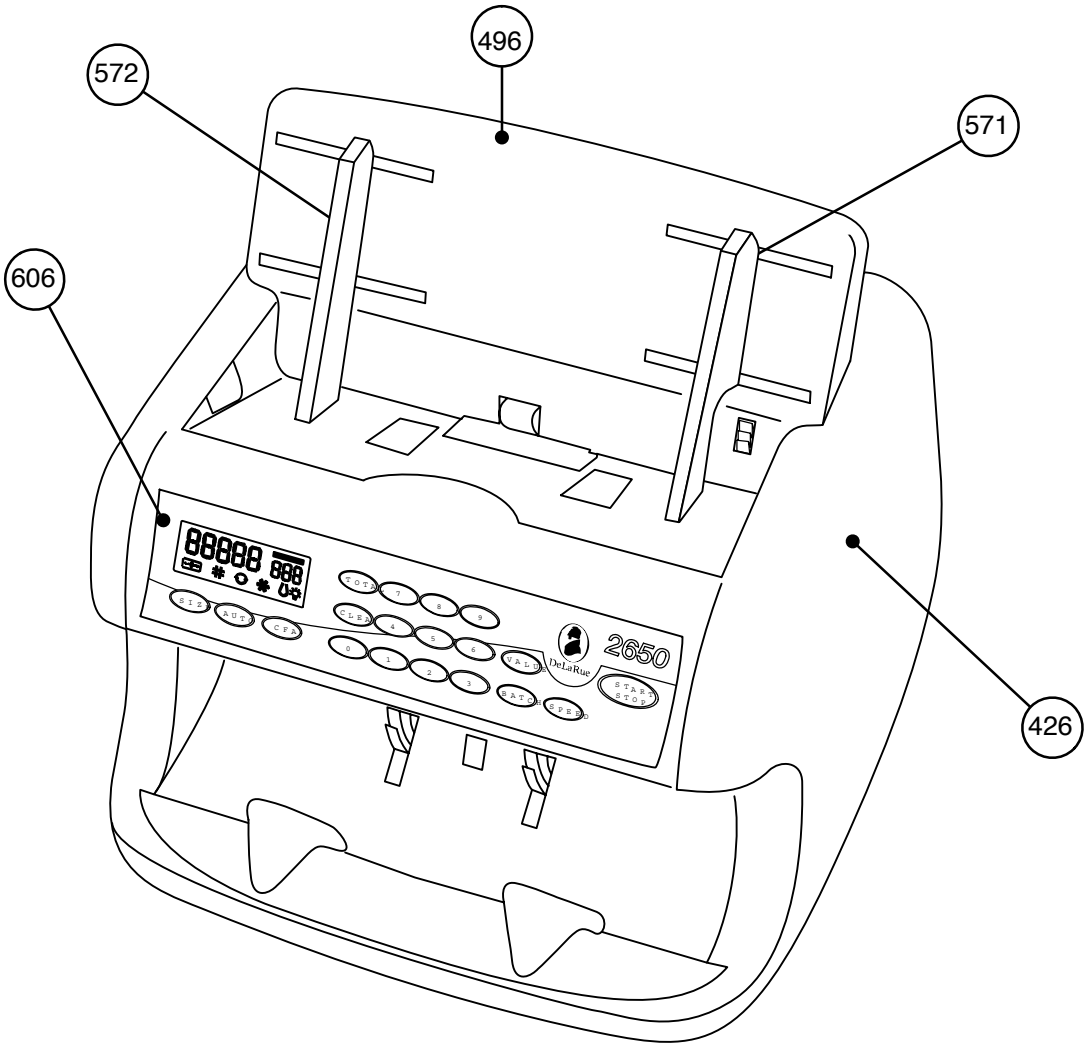


Figure 1. 2650 Banknote Counter General View

3. MECHANICAL DESCRIPTION

For a general mechanical description of the 26xx range of machines refer to Section 2 of this manual.

4. ELECTRICAL DESCRIPTION

The electrical description is identical to that given in Section 3 of the main manual with the following differences:

- The main controller PCB provides an interface to optional detectors.
- The front panel display comprises a 5 digit count display plus a 3 digit batch display.

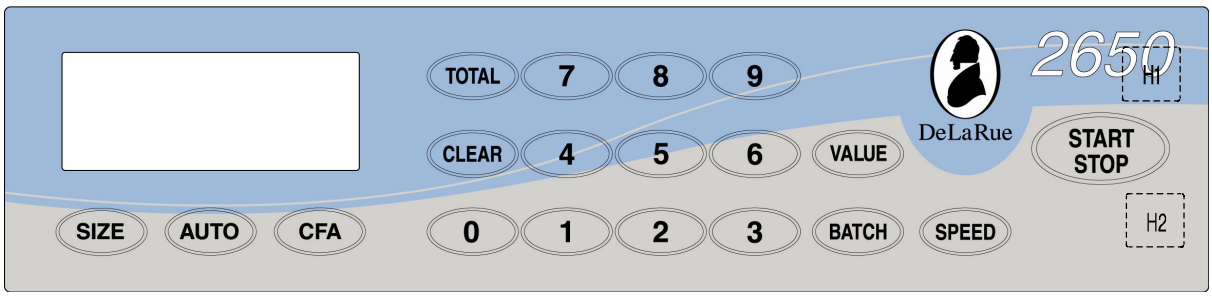


Figure 2. 2650 Control Panel

- The keypad is of membrane construction with a matrix of 21 keys (7 columns by 3 rows). The key layout is shown in Figure 2.

SK5 – Membrane

Pin No	Remarks
1	Column 7 out
2	Column 6 out
3	Column 5 out
4	Column 4 out
5	Column 3 out
6	Column 2 out
7	Column 1 out
8	Row 3 in
9	Row 2 in
10	Row 1 in

An interconnection diagram for the 2650 machine is shown in Figure 4.

5. ERROR MESSAGES

Error messages displayed during machine operation include rEP, dEn, CF, FAUlt, JA, CLEAr, HALF, tAbLE, Err Prt, GULP, FEEd, Lid, CLEAn, UnCAL, Found, ibuS, CnS and Error. When some of these messages are displayed additional information about the type of error can be obtained by pressing the H1 key. To display the number of correctly counted notes prior to the error occuring press the H2 key. See Appendix 13 for details.

6. ENGINEER DIAGNOSTICS

Entry into engineer diagnostics is achieved by pressing and holding hidden key H1 then pressing the SIZE key (refer to Figure 2 for key location). In all diagnostic modes except 7 and 15, pressing the SIZE key once will return the machine to the diagnostic select mode, allowing another diagnostic function to be selected. Pressing the SIZE key while in the select mode causes a machine reset, returning it to normal operation. On entry into machine diagnostics, the following is shown on the count display:

'tESt'	–	for 1 second
'xxxx'	–	software version/revision for one second
'dn1'	–	diagnostics mode 1

The machine is now in the diagnostic select mode.
To select a particular diagnostic mode press the numeric keys for the required number.
The START key is used to enter the diagnostic mode selected and the SIZE key is used to exit from the diagnostic mode.
Note that if the machine exits from diagnostic mode with uncalibrated detectors the display will show 'UnCAL dEt'.

6.1 Diagnostic 0 – CRC, Version and Revision Numbers

Diagnostic mode 0 displays the CRC, Version and Revision numbers. On entry into this diagnostic mode the display shows the software version and revision. The CRC is displayed by pressing the zero key on the numeric keypad.

To exit base diagnostics press the SIZE key.

6.2 Diagnostic 1 – Sensor Check

Diagnostic mode 1 allows the operation of the following sensors to be checked:

- Stacker
- Transport
- Feed
- Doubles Detect (left)
- Doubles Detect (right)

On entry into this diagnostic pressing the START key twice will run the transport at 1000 npm with the COUNT display showing '– – – – –' with no notes being fed, and with a correctly working machine.
If the stacker, transport and feed sensors are blocked then unblocked in succession the display will change to '_ – – – –', '– _ – – –', '– – _ – –' and then back to '– – – – –' if all the sensors are working correctly.
If there is a fault or lack of correct calibration on either of the doubles detectors the display will show '– – – _ –' or '– – – – _' for the left and right detectors respectively. With the machine in this state, pressing the 0 or 1 keys will display the offset values in the 4th and 5th character locations on the display for the left and right doubles detectors respectively.

Press the STOP key.
If a fault or lack of calibration is indicated the detector should be recalibrated prior to further diagnosis of the fault (see paragraph 6.3).
Press the SIZE key to exit.

6.3 Diagnostic 2 (d2) – Auto Double Detect Setting

Diagnostic mode 2 allows the doubles detect gain to be set automatically as follows:

When this mode is entered the display will show 't – –'. Place a pack of test notes* (149 x 80mm – Part No. 02390166) in the feed hopper and press the START key to start the setup cycle. The machine will feed 10 notes, make it's own adjustments and then feed another ten notes. The cycle will continue until either the machine runs out of notes or 3 consecutive batches of 10 are measured correctly within limits. The display shows 'y – –' where y is the number of batches of 10 with double detect in limits (0, 1, 2 or 3). The middle digit is the LHS double detect indicator and the right digit is the RHS double detect indicator. The middle bar is lit when the double detect is within limits. If the double detect is greater than the upper limit the top bar will be lit and if the double detect is below the lower limit then the bottom bar will be lit.

* The test document is used in preference to an actual banknote due to its consistent note thickness. Using the incorrect document may result in an increased stop rate.

If an out of limits error occurs then the indicator for that double detect will flash.

To exit to base diagnostics press the SIZE Key.

Note: Diagnostic 3 and 4 are used to define the maximum and minimum short edge note sizes that will be accepted when in an auto size mode (non value count or denom entry value mode), when the note size table is not in use. In effect they set the tolerance of the acceptable note size based on the first note counted in each batch.

6.4 Diagnostic 3 – Autosize Lower Limit (short edge) (SD and 3D machines only)

Diagnostic mode 3 sets the size lower limit (short edge dimension). When the mode is entered the display shows 'xxx Ent'. Key in the required limit on the keys 0 – 9 (maximum 3 digits). The display shows the limit in tenths of a millimetre (i.e. 10 is equivalent to 1.0mm, 105 is equivalent to 10.5mm). The default is 30 (i.e. –3.0mm).

Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press the SIZE key to exit. Switch the machine off and back on again to ensure the new values are correctly set.

6.5 Diagnostic 4 – Autosize Upper Limit (short edge) (SD and 3D machines only)

Diagnostic mode 4 sets the size upper limit (short edge dimension). When the mode is entered the display shows 'xxx Ent'. The size is input as detailed in paragraph 6.4. The default is 20 (i.e. +2.0mm). Press the SIZE key to exit. Switch the machine off and back on again to ensure the new values are correctly set.

Note: The values obtained in Diagnostic 3 and 4 are saved in non volatile memory and hence are retained when the machine is powered down.

6.6 Diagnostic 5 – Manual Programming and Configuration of the Size/Denomination Table.

Diagnostic mode 5 is used to view and set the size limits and denominations for operation in Value mode, via the keypad. The 3D note counter allows the size table to be split into two partitions. This enables the size detector to function with either one of two different currencies, selectable by the operator.

The size table partitioning allows one currency range to be stored in the lower size table (locations 1 to 10) and another currency range stored in the upper size table (locations 11 to 20).

When the machine is operating in value or dispense mode, the operator can select the size table partition which contains the size limits for the currecy to be counted. The size detector uses these limits for comparison with the note sizes, in order to determine the correct denomination value. The machine has a seperate value count total for each size table partition.

The machine can also be configured to operate with one currency range using the full size table, with no partition. In this mode the size partition selection will not function. The size table can only be changed from non–partitoned to partitioned mode (or vice versa) in diagnostics. The change would normally be carried out after the size table has been downloaded, where a check for conflicts within the size limits can be carried out.

Confirmation of partition setting

On entry into value or dispense mode following power up, or selection by the operator using the VALUE key, the 2650 will momentarily display the currently selected size table partition mode for two seconds:

Curr_x

where x = 1 for the lower partition and 2 for the upper partition.

This is a prompt to the operator to verify that the correct partition is selected before the machine is used to count notes. This prompt will not occur if the size table is not partitioned or if the 2650 is in non–value mode.

Size table partition selection

To select either the upper or lower size table partitions, press and hold the SIZE key until the display shows the currently selected size table partition:

Curr_x

where x = 1 for the lower partition and 2 for the upper partition.

To change the current size table partition press either the ‘1’ key or the ‘2’ key while the SIZE key is still pressed. The change will be shown on the display.

The partition selection display will only function:

if the 2650 size table has been configured in diagnostic 5 as partitioned and

when the 2650 is in value or dispense mode and both the feed and stacker hoppers are empty.

The size table partition will not function in non–value mode or when the 2650 is logged on to CMS.

Partitioned value count totals

The 2650 stores a seperate value count total for each size table partition. This enables the operator to switch between the two currencies whilst retaining independent value totals. The value total associated with a size table partition is restored on the display when the size table partition has been selected by the operator, providing the 2650 remains operating in value or dispense mode. Changing to non–value mode will clear the partioned value count totals.

Size table download and configuration

The functions for changing the size table from partitioned to non–partitioned (or vice versa) are only accessible in diagnostic 5. This allows configuration immediately after the size table has been downloaded into the 2650 from a PC, or manually entered via the 2650 keypad.

A check for conflicts in the size table is performed whenever it is downloaded or manually entered, or when the size table partition is reconfigured in diagnostic 5.

For a partitioned size table it is necessary to download a text file containing the denomination values and size limits for both currencies in the partitioned size table locations. The unused location fields should be set to zero. The procedure for downloading the size table from a PC using the CMS Interface is detailed in Appendix ?? – Value Added Software. Alternatively, the denomination values and size limits can be entered manually.

The size table is now configured as partitioned. A seperate check for conflicts is performed on the lower and upper table partitions, otherwise the conflicts check is carried out on the full table.

The engineer can select either:

no partition – this is the default, where the novram has been initialised or

partition mode, with either the upper or lower size table partitions as the default setting in novram (selected on power up).

There is an option to check for conflicts by pressing the TOTAL key. However, the conflicts check is still run when the SIZE key is pressed to exit diagnostic 5.

Pressing the BATCH key changes the display to show the currently selected size table partition mode:

Curr_x

where x = 0 for no partition, 1 for the lower partition and 2 for the upper partition.

To change the current size table partition press either the ‘0’ key, the ‘1’ key or the ‘2’ key. The change will be shown on the display.

Pressing the START key causes the currently selected size table partition mode to be stored in novram as the power on default. This is indicated by ‘donE’ on the display when novram has been updated. Pressing the START key again returns the display to the size table entry mode.

Pressing the size key in size table partition selection mode returns the display to the size table entry mode, with the size table partition unchanged in novram.

Size table address display and edit

When diagnostic mode 5 is selected the display will show ’Edit n’, where n is the size/denomination table entry address (1 to 20).

The table address may be changed by pressing the CLEAR key to reset the table address to zero and then using the numerical keys to enter the new table address. If a table address is entered which is greater than 20 the display will reset to zero.

Pressing the ’SIZE’ key will cause diagnostic 5 to be exited.

Denomination value display and edit

Pressing the ’START’ key with a valid table address entered will select the denomination value corresponding to the current table address for display and editing. The display will show the current denomination value preceded by ’d’ (e.g.’d 100’, or ’d 2 –50’). A denomination value of zero indicates that the table address is empty.

A different denomination value is entered by pressing the ’CLEAR’ key to reset the denomination value to zero and then using the numeric keys to enter a valid denomination base value.

An invalid entry will cause the display to reset to zero. Valid denomination base values are 1, 2, 3, 4, 5, 6, 7, 8, 9, 25 and 45.

– Use the ’0’ key to multiply the displayed denomination value by 10 until the correct denomination is shown. If the denomination value exceeds 9000 000 the display will be reset to zero.

– Use the ’BATCH’ key to divide the displayed denomination value by 10. If the base denomination value is entered on the display without any following zeros, then pressing the ’BATCH’ key will change the display to show the decimal point followed by the fractional part of the denomination value. If the displayed value cannot be further divided by 10 the ’BATCH’key is ignored.

– The ’0’ and ’BATCH’ keys may be used to correct the 10’s multiplier for the base denomination value, by multiplying or dividing by 10. If the result of multiplying by 10 produces a value with a zero decimal fraction the display will revert to normal without the decimal point or decimal fraction digits.

Examples:

a. Entered Base value = 25

multiplier	displayed value
x 1	d 25
x 10	d 250
x 100	d 2 500
x 1000	d 25 000
x 10000	d 250 000
x 100000	d2500 000
1/10	d 2 –50
1/100	d 0 –25

b. Entered Base value = 5

multiplier	displayed value
x 1	d 5
x 10	d 50
x 100	d 500
x 1000	d 5 000
x 10000	d 50 000
x 100000	d 500 000
x 1000000	d5000 000
1/10	d –50
1/100	d –05

Press the 'SIZE' key to revert back to the size table address display and edit mode, or the 'START' key to proceed to size limit entry mode.

Lower short edge size limit display and edit

Pressing the 'START' key with a valid denomination value entered will select the lower short edge limit corresponding to the current table address for display and editing. The display will show the current short edge lower limit in tenths of a millimetre followed by 'Lo', with the appropriate size icon flashing to indicate that the limit corresponds to the short edge dimension.

Example: ' 825 Lo' indicates a lower limit of 82.5 mm.

The limit may be changed using the numerical keys to enter a different value.

Press the 'SIZE' key to revert to the denomination value display and edit mode, or the 'START' key to proceed to the upper size limit entry. (If the entered limit is invalid, the display reverts to 0, ready to re–input the limit value).

Upper short edge size limit display and edit

Pressing the 'START' key with a valid lower short edge limit entered will select the current upper short edge limit corresponding to the

selected table address for display and editing. The display will show the current short edge upper limit in tenths of a millimetre followed by 'Hi', with the size icon flashing to indicate that the limit corresponds to the short edge dimension.

Example: ' 850 Hi' indicates an upper limit of 85.0 mm.

The limit may be changed using the numerical keys to enter a different value.

Press the 'SIZE' key to revert to the lower short edge limit display and edit mode.

Pressing the 'START' key with a valid upper short edge limit entered will initiate a check on the difference between upper and lower short edge limits. (If the entered limit is invalid, the display reverts to 0, ready to re–input the limit value). If the difference is greater than 10.0mm the limits will not be programmed and the display will revert back 0, ready to input a valid upper limit. If the difference is less than 10.0mm the next phase will depend on whether it is an SD or a 3D size detector. For an SD detector, as there are no long edge limits, the denomination value and short edge limits will be written into the size table address in NOVRAM.

The display will indicate 'bUSY' while the updated size table entry is being written into NOVRAM, followed by 'donE' when the update is complete.

Note: 1 : During this update period the machine also checks this size data for conflicts with other existing table entries. If there is a size conflict the machine will report a status code instead of the 'donE' message. The status message is of the form:

St_nn XXX where nn = table address

XXX = status code

(see Table 1 at the end of this section for a list of the status codes.)

If a conflict is indicated then either :

1. Press the SIZE key to return to edit mode and re–enter the table data to avoid a conflict, or

2. Press the START key which will display the next table location with a conflict until 'donE' is displayed (ie. no more conflicts).

If (2) is selected then the data is accepted regardless of conflicts and the machine can only function in fixed size mode. Auto–denomination assignment selection is disabled. (A note fed could fall into more than one category if this were not done).

Note: 2 : The full conflicts check must be carried out (before diagnostics exiting diagnostics) by pressing the TOTAL key, otherwise a table error may occur when counting using the size table.

Lower long edge size limit display and edit (3D only)

Pressing the 'START' key with valid short edge limits entered will select the lower long edge limit corresponding to the current table

address for display and editing. The display will show the current long edge lower limit in tenths of a millimetre followed by 'Lo', with the appropriate size icon flashing to indicate that the limit corresponds to the long edge dimension.

Example: ' 1525 Lo' indicates a lower limit of 152.5 mm.

The limit may be changed using the numerical keys to enter a different value.

Press the 'SIZE' key to revert to the lower short edge limit display and edit mode, or the 'START' key to proceed to the upper size limit entry. (If the entered limit is invalid, the display reverts to 0, ready to re–input the limit value).

Upper long edge size limit display and edit (3D only)

Pressing the 'START' key with a valid lower long edge limit entered will select the current upper long edge limit corresponding to the selected table address for display and editing. The display will show the current long edge upper limit in tenths of a millimetre followed by 'Hi', with the size icon flashing to indicate that the limit corresponds to the long edge dimension.

Example: ' 1550 Hi' indicates an upper limit of 155.0 mm.

The limit may be changed using the numerical keys to enter a different value. However, if the value is outside the maximum and minimum long edge size limits the display will reset to zero.

Press the 'SIZE' key to revert to the lower long edge limit display and edit mode.

Pressing the 'START' key with a valid upper long edge limit entered will initiate a check on the difference between upper and lower long edge limits. (If the entered limit is invalid, the display reverts to 0, ready to re–input the limit value). If the difference is greater than 10.0mm the limits will not be programmed and the display will revert back to 0, ready to input a valid upper limit. If the difference is less than 10.0mm, the denomination value, short edge limits, and long edge limits will be written into the size table address in NOVRAM.

The display will indicate 'bUSY' while the updated size table entry is being written into NOVRAM, followed by 'donE' when the update is complete. Operation of the START key will revert to the size table address display and edit mode.

Note : see also Note 1

To review the conflict status of a table, press the 'TOTAL' key with the 'Edit n' message displayed. The display will show 'bUSY' then 'donE' if no conflict is present or will display the status code shown in note 1 at each table address where a conflict is evident. Use the 'START' key to cycle through all table addresses, with a conflict, until the message 'donE' is displayed.

TABLE 1 : STATUS OF TABLE ENTRY		
XXX =	1	Overlap between short edge size limits (short edge auto–denomination inhibited).
	2	Overlap between long edge size limits (long edge auto–denomination inhibited).
	4	Coincident overlaps between long edge and short edge size limits (mixed bundle operation inhibited).
	8	Less than 2.5mm gap between one of the short edge size limits and another of the size table entry short edge limits.
	16	Less than 3.0mm gap between one of the long edge size limits and another of the size table entry long edge limits.
	32	The total short edge dimension of two stream fed notes is within the short edge size limits of another size table entry.
	64	Size entry or denomination not programmed.
	128	Size entry outside machine specification.

Status numbers 8 to 128 are warnings only and do not prevent machine operation in auto–denomination mode.

Status 64 may cause a run–time error only if the selected denomination does not have size data associated with it in the size controller (fixed mode), or if the size data in the size controller does not have a denomination associated with it (auto mode).

If more than one condition exists then the numbers are added together, for example :

if XXX = 9 then the errors are 8 + 1

if XXX = 131 the the errors are 128 + 2 + 1

Allowable sizes for table entries :–

Min. note size (short edge dimension)	45mm
Max. note size (short edge dimension)	120mm
Min. note size (long edge dimension)	95mm
Max. note size (long edge dimension)	200mm
Max. difference in short edge dims.	10mm
Max. difference in long edge dims.	10mm

Sample Dual Size Table

DESCRIPTION: 2620 SIZE TABLE LIMITS FOR FRENCH AND EUROPEAN CURRENCIES ON A 2650 3D MACHINE.

CURRENCY: FRENCH FRANCS IN LOWER PARTITION, EURO IN UPPER PARTITION.

FRENCH CURRENCY IN THE LOWER SIZE TABLE PARTITION

D1,20,71.0,76.0,135.5,143.5
D2,50,77.0,82.0,118.5,126.5
D3,100,77.0,82.0,128.5,136.5
D4,200,77.0,82.0,138.5,146.5
D5,500,77.0,82.0,148.5,156.5
D6,100,82.1,87.0,155.5,163.5
D7,200,89.0,94.0,167.5,175.5
;NOT USED
D8,0,0.0,0.0,0.0,0.0
D9,0,0.0,0.0,0.0,0.0
DA,0,0.0,0.0,0.0,0.0

;EURO CURRENCY IN THE UPPER SIZE TABLE PARTITION

DB,5,59.0,64.0,117.0,122.0
DC,10,64.5,69.0,124.0,129.0
DD,20,69.5,74.0,130.0,135.0
DE,50,74.5,79.0,137.0,142.0
DF,100,79.5,84.0,144.0,149.0
DG,200,79.5,84.0,150.0,155.0
DH,500,79.5,84.0,157.0,162.0
;NOT USED
DI,0,0.0,0.0,0.0,0.0
DJ,0,0.0,0.0,0.0,0.0
DK,0,0.0,0.0,0.0,0.0

6.7 Diagnostic 6 – Size Detector Calibration (SD and 3D machines only – short edge dimension)

Note: Diagnostic mode 16 must be carried out prior to calibration.

Diagnostic mode 6 is used to display the average note length measured by the size detector, and adjust/calibrate the scale offsets in the size detector novram.

The COUNT display indicates the average right hand side note length measured by the size detector in the counted bundle (in tenths of a millimetre), and the BATCH display indicates the average left hand side note length.

Note these dimensions. The displays can be changed to show the overall average note length on the COUNT display and the number of notes counted on the BATCH display.

In diagnostic mode 6 the key functions are:

START – Clears any displayed errors and starts the machine if notes are in the feed hopper.

H1 – Sets the mode of operation so that the COUNT display shows the LHS average note length and the BATCH display shows the RHS average note length. In this mode the BATCH bar is OFF.

H2 – Sets the mode of operation so that the COUNT display shows the overall average length and the BATCH display shows the number of notes counted. In this mode the BATCH bar is ON.

BATCH – Displays the minimum and maximum measured note lengths measured on the RHS size detector. The COUNT display shows the minimum, and BATCH display shows the maximum.

VALUE – Displays the minimum and maximum measured note lengths measured on the LHS size detector. The COUNT display shows the minimum, and BATCH display shows the maximum.

AUTO – Selects/deselects the auto–start count mode indicated by the AUTO icon.

CFA – Allows the size detector LHS and RHS scale offsets to be adjusted in novram, using the average length measured from a counted bundle of notes, together with an entered value for the actual note length. The procedure is as follows:

a. Press the H1 key (bar over batch display disappears). Load notes into the feed hopper (of known size, between 75 and 90mm, to $\pm$ 0.2mm) and press START.

b. Press and hold the BATCH key. Check that both measurements displayed are within $\pm$1.0mm of the RHS average recorded above. Release the BATCH key. Press and hold the VALUE key. Check that both measurements displayed are within $\pm$1.0mm of the LHS average recorded above. Release the VALUE key. Proceed only if the machine passes this test. (If the sizes displayed are outside the tolerance specified, check the calibration notes for edge damage, remove from the pack and repeat the test).

c. To adjust the size detector scale offset press the CFA key (display shows ‘EntEr LEn’) and then use the numeric keys to enter the specified short edge dimension of the test document onto the COUNT display (in tenths of a millimetre).

d. Once the correct length has been entered press the START key and the display will change to show ‘buSy’ while the scale offsets are being calculated and saved in the size detector novram, followed by ‘donE’ when it is completed.

e. Reload the calibration notes and press the START key to count the notes again and check the average RHS and LHS lengths obtained with the adjusted scale offsets. (Satisfactory if measured length is within ± 0.2mm of actual dimension).

f. Repeat this process of feeding calibration notes and checking the measured dimension until it is within ± 0.2mm of actual dimension,

g. Press the SIZE key to exit.

6.8 Diagnostic 7 – Set Size Detector Control (SD machines only)

Diagnostic mode 7 allows the grade of size detection to be changed. When the mode is entered the display shows ‘dt_x’, where x = 1 or 2:

x = 1	The larger of the two sensor readings is required to be within limits (default setting).
x = 2	Both sensor readings are required to be within limits.

The value of x is selected using keys 1 or 2.

The detection level grade is not normally stored in non volatile memory and hence will be reset to the default value if the machine is reset (i.e. x = 1). However, if the START key is pressed at this point, the new grade will be stored in NOVRAM.

Press the SIZE key to exit.

6.9 Diagnostic 8 – Magnetic Presence Detector Calibration (EMG machines only)

To calibrate an EMG detector the following items are required:

- 100 US $1 notes. These must be in good condition with no tears or tape.
- 100 dollar sized test notes, part number OA390345.
- 2 or more DLR MG test documents, part number D102422.

Display Messages

The count display shows which document is to be used for the test in progress:

- CrnCy – US currency.
- T–doC – DLR test document OA390345.

The batch display is used to indicate the status of each test and is updated at the end of each pack. The left digit is the signal strength

indicator and the middle digit is the non–magnetic document noise indicator. The status characters are as follows:

'P' = PASS

'F' = FAIL

'–' = test not completed

Set–up Procedure

Enter diagnostic mode 8 by holding hidden key H1 and then pressing the SIZE key. Press numeric key number 8. The display shows 'CrnCy——' to indicate to the user that the machine is ready for the currency test.

Place the pack of US $1 notes face up in the feed hopper and run the notes until 'P' is displayed.

Place the pack of notes face down in the feed hopper and run until 'T–doC P' is displayed.

Run the DLR notes, OA390345, until the indicator displays 'P' and the count display shows 'donE'.

Set–up has now been completed. Press the SIZE key twice to exit diagnostics.

Test

In count mode, with the EMG detector enabled, feed the pack of US $1 notes five times. Check that no false stops occur.

Place the two MG test documents (D102422) randomly in the pack and again feed the pack five times. The 2650 should stop on the test documents and display a CF error for each test document.

If the 2650 fails this test repeat the set–up procedure.

6.10 Diagnostic 9 – View Output and Calibrate UV Detector (UV machines only)

Diagnostic mode 9 is used to check the operation of the UV detector and to calibrate it. The BATCH display indicates the total number of notes counted in the bundle. The COUNT display indicates the number of notes counted having a UV presence level above the threshold (set to 10). The COUNT display can be changed to show the UV presence level for each note as it is counted.

In diagnostic mode 9 the key functions are:

START	– Clears any displayed errors and starts the machine if notes are in the feed hopper.
TOTAL	– Displays the total number of UV presences for the last bundle of notes counted.
H1	– Sets the mode of operation so that the COUNT display shows the UV presence level for each note as it is counted. In this mode the BATCH bar is ON.
H2	– Sets the mode of operation so that the COUNT display shows the number of notes counted having UV presence level above the threshold. In this mode the BATCH bar is OFF.

BATCH – Displays the maximum UV presence level obtained from a note in the last bundle.

VALUE – Displays the minimum UV presence level obtained from a note in the last bundle.

SPEED – Displays the average UV presence level for the notes in the last bundle.

AUTO – Selects/deselects the auto–start count mode indicated by the AUTO icon.

CFA – Selects the UV detector calibration mode, which is used to calibrate the UV signal and reference amplifier digital potentiometer settings as follows:

Note: The UV detector calibration sequence should only be carried out when the machine has been powered up for at least two minutes.

a. On entering the UV detector calibration mode the display will show 'EntEr doC', which is a prompt to insert a calibration document (02390145 – Calibration Document (Calibrated)) into the machine in front of the UV detector.

Note: The calibration document should be stored in the dark and only exposed to light for short periods whilst calibrating the machine. Failure to comply with this can affect document calibration.

b. To insert the calibration document open the detector box and place the calibration document below the UV detector window. Close the detector box.

c. Enter the UV calibration level for the document, printed on the document, using the numeric keys and then press the START key.

d. The display will show 'buSY' while the UV calibration is in progress, followed by 'donE' when it is completed.

e. Pressing the H1 key enables the UV reference amplifier potentiometer setting ('reF'), the signal amplifier calibration level ('CAL') and signal amplifier potentiometer ('dEt') setting to be displayed. The parameters are displayed in sequence by pressing the START key, the display will show 'donE' at the end of the sequence.

f. The UV calibration mode is terminated by removing the calibration document and pressing the START key.

g. The UV amplifier potentiometer settings are retained in the main controller NOVRAM and are used to set up the UV detector when it is initialised.

h. Press the SIZE key to exit.

UV lamp warm up indication

When the 2650 machine is turned on, whilst the UV lamp output is outside acceptable limits, the UV icon will flash on the display. The lamp icon will stop flashing as soon as the UV lamp output is inside acceptable limits. The machine will not allow a count operation while the UV icon is flashing and will report a fault on the display if a start is initiated by the operator. The machine can be used in this condition, however, if the UV detector is deselected.

6.11 Diagnostic 10 – CMS Configuration Parameters (Non Euro CMS machines only)

This diagnostic mode is used to change the RS232 interface configuration parameters for CMS operation and includes Baud Rate, Poll Rate, Stop Bits, Parity Mode and Data Bits selection.

On entering this mode the baud rate selection is displayed. The sequence for programming the RS232 configuration parameters is as follows:

a. Baud Rate Selection.

The display shows the current baud rate with BAU indicated on the RHS.

e.g. 9600 bAU

The baud rate options are 1200, 2400, 4800, 9600 and 19200, where 9600 is the factory default.
Press the BATCH key repeatedly to scroll round the baud rate options on the display, and press the START key to enter the selected baud rate into NOVRAM. The display will then move on to the poll rate selection.

b. Poll Rate Selection.

The display shows the current poll rate with PLO indicated on the RHS.

e.g. 10 POL

The Poll rate may be set in the range 100mS to 2.5 seconds, and is displayed in multiples of 100mS (i.e. 1 second = 10 on the display), and the factory default is 1 second.
Use the numerical keys to change the poll rate on the display, and press the START key to enter the selected poll rate into NOVRAM. The display will then move on to the number of stop bits selection.

c. Number of Stop Bits Selection.

The display shows the current number of stop bits with StP indicated on the RHS.

e.g. 1 StP

The number of stop bits can be set to either 1 or 2, where the factory default is 1 stop bit.
Press either ‘1’ or ‘2’ numerical key to change the number of stop bits on the display, and press the START key to enter the selected number of stop bits into NOVRAM. The display will then move on to the parity mode selection.

d. Parity Mode Selection.

The display shows the current parity mode with PAr indicated on the RHS.

e.g. EvEn PAr

The parity mode options are NonE, odd, and EvEn, where the factory default is EvEn parity.

Press the BATCH key repeatedly to scroll round the parity mode options and press the START key to enter the selected parity mode into NOVRAM. The display will then move on to the number of data bits selection.

e. Number of Data Bits Selection.

The display shows the current number of data bits with dAt indicated on the RHS.

e.g. 7 dAt

The number of data bits can be set to either 7 or 8, where the factory default is 7 data bits.

Press either the '7' or '8' numerical key to change the number of data bits on the display, and press the START key to enter the selected number of data bits into NOVRAM. The display will then return to the baud rate selection.

The SIZE key may be pressed at any time to exit diagnostic 10, but an option that has been altered on the display will only be entered in novram by pressing the START key first.

6.12 Diagnostic 13 – Cycling of Motors

Diagnostic mode 13 cycles the machine motors as if batching 100 notes, continuously. It is not intended for heavy use which would result in rapid wear occurring.

Press the START/STOP key to start or stop the cycle and select 'Auto' for continuous operation.

FO, tO indicates feed and transport motors off, F1, t1 motors on. Press the SIZE key to exit.

6.13 Diagnostic 14 – Initialise Non Volatile Memory

Entry into diagnostic mode 14 sets the non volatile memory to the default values. Press the START key, the display will show 'SEt'. Press the START key again, the display will show 'donE'.

If the machine is unable to set the non volatile memory, the display shows 'FAIL'.

Press the SIZE key to exit.

Note: This diagnostic resets the Doubles Detector and detector calibration (UV) settings,use diagnostic 2 before returning machine to service, and re–calibrate the detector.

6.14 Diagnostic 15 – Set Count Speed

Note: This diagnostic sets the transport speed, ***not*** *the throughput rate. A throughput rate of 1500 n.p.m. is equivalent to a transport speed of approximately 1800 n.p.m.*

Diagnostic mode 15 enables the note count speed to be altered. When the mode is entered, the COUNT display shows the note count speed in notes per minute (npm). The speed is changed by entering

the required speed using the numeric keys (valid range 400 to 2500 npm). On exit from this diagnostic, using the SIZE key back to base diagnostics, further diagnostic functions will run at the selected speed.

Pressing the SIZE key again to exit to normal operation, will reset the speed to that on entry to the diagnostics.

6.15 Diagnostic 16 – Initialise Size Detector Non Volatile Memory (SD/3D machines only)

Note: This diagnostic mode must be carried out prior to calibration (diagnostic mode 6 or diagnostic mode 22).

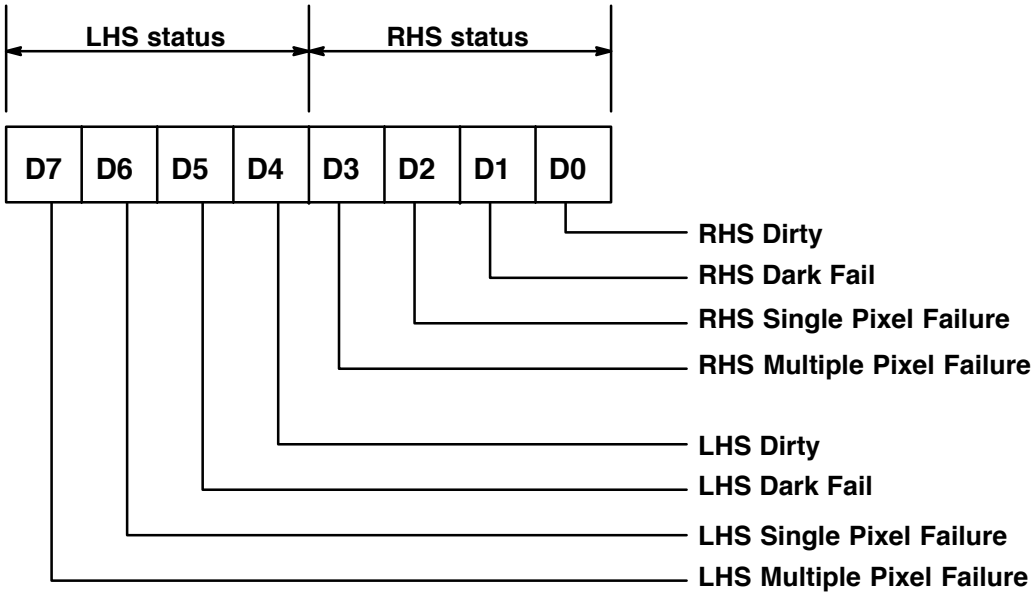
On entry into diagnostic mode 16 the machine will display 'rEAdY'. On pressing the START key the machine will display 'buSY' and then 'donE' when the initialisation is complete (or 'FAIL' if unsuccessful). Pressing the SIZE key will then exit from the diagnostic.

Note: This diagnostic resets size parameters and clears the size/denomination table. It may take 10 seconds to complete this initialization.

6.16 Diagnostic 21 – Size Detector Profile Check (3D machines only)

Diagnostic mode 21 is used to check that the right and left hand detectors are free of errors. Clean the detector windows prior to doing this test, using a dry cleaning swab (Part No. 02340279 – pack of 50).

On entry into this diagnostic the COUNT and BATCH displays show the error status of the left and right hand detector respectively. A zero display indicates a correctly working detector. Any other display indicates a faulty detector decimal value where:



6.17 Diagnostic 22 – Size Detector Calibration (3D machines only – long edge dimension)

Note: Diagnostic mode 16 must be carried out prior to calibration.

Diagnostic mode 22 is used to display the average long edge dimension measured by the size detector, and adjust/calibrate the spacing offset in the size detector novram.

Load notes into the feed hopper (of known size, between 120 and 160mm to ± 0.2mm) and press START.

The COUNT display indicates the average note length measured by the size detector in the counted bundle (in tenths of a millimetre), and the BATCH display indicates the number of notes counted. Note the average note length dimension displayed.

In diagnostic mode 22 the key functions are:

START	– Clears any displayed errors and starts the machine if notes are in the feed hopper.
BATCH	– Displays the maximum long edge dimension measured on the COUNT display.
VALUE	– Displays the minimum long edge dimension measured on the COUNT display.
AUTO	– Selects/deselects the auto–start count mode indicated by the AUTO icon.
CFA	– Allows the spacing offset to be adjusted in novram, using the average length measured from a counted bundle of notes, together with an entered value for the actual long edge dimension. The procedure is as follows:

a. Press and hold the VALUE key. Check that the COUNT display measurement is within ±2.0mm of the average recorded above. Release the VALUE key. Press and hold the BATCH key. Check that the COUNT display measurement is within ±2.0mm of the average recorded above. Release the VALUE key. Proceed only if the machine passes this test. (If the sizes displayed are outside the tolerance specified, check the calibration notes for edge damage, remove from the pack and repeat the test).

b. To adjust the size detector scale offset press the CFA key (display shows ‘EntEr LEn’) and then use the numeric keys to enter the specified long edge dimension of the test document onto the COUNT display (in tenths of a millimetre).

c. Once the long edge dimension has been entered press the START key and the display will change to show ‘buSy’ while the spacing offset is being calculated and saved in the size detector novram, followed by ‘donE’ when it is completed.

d. Reload the calibration notes and press the START key to count the notes again and check the average long edge dimension obtained with the adjusted spacing offset. (Satisfactory if measured length is within ± 0.5mm of actual dimension).

e. Pressing the H1 key before the START key in (c) enables the spacing offset to be viewed, where the START key is then used to change the display back to ‘donE’.

f. Press the SIZE key to exit.

Note: Diagnostic 23 and 24 are used to define the maximum and minimum long edge note sizes that will be accepted when in an auto size mode (non value count or denom entry value mode), when the note size table is not in use. In effect they set the tolerance of the acceptable note size based on the first note counted in each batch.

6.18 Diagnostic 23 – Autosize Lower Limit (3D machines only – long edge lower limit)

Diagnostic mode 23 sets the size detector lower size limit (long edge dimension). When the mode is entered the display shows 'Ent'. Key in the required limit on the keys 0 – 9 (maximum 3 digits). The display shows the limit in tenths of a millimetre (i.e. 10 is equivalent to 1.0mm, 105 is equivalent to 10.5mm). The default is 40 (i.e. –4.0mm).

Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press the SIZE key to exit.

6.19 Diagnostic 24 – Autosize Upper Limit (3D machines only – long edge upper limit)

Diagnostic mode 24 sets the 3D size detector upper size limit (long edge dimension). When the mode is entered the display shows 'Ent'. Key in the required limit on the keys 0 – 9 (maximum 3 digits). The display shows the limit in tenths of a millimetre (i.e. 10 is equivalent to 1.0mm, 105 is equivalent to 10.5mm). The default is 30 (i.e. 3.0mm).

Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press the SIZE key to exit.

6.20 Diagnostic 45 – Totals Stored in NOVRAM

Diagnostic 45 allows the background totals stored in novram to be displayed. On entry into diagnostic mode 45 the machine will display the total number of notes counted. Use the numeric keypad to select the other totals:

0 = Total notes

1 = Total rEPs (repeated notes in stacker)

2 = Total CF's (detector errors – machines fitted with additional detectors only)

3 = Total dEn's (size error detections)

4 = Total jams

The NOVRAM totals can be reset by pressing and holding the TOTAL key and then pressing the CLEAR key.

Press the SIZE key to exit.

7. SUPERVISOR FUNCTIONS

A supervisor mode of operation is provided to enable the operator to change various machine set up parameters.

Entry into the supervisor mode is achieved by pressing and holding the TOTAL key and then pressing a numeric key (0 to 9), the BATCH or SPEED key to enter the required supervisor mode. Generally the selected supervisor mode is shown on the BATCH display whilst the control information is shown on the COUNT display.

To exit the supervisor mode, press the TOTAL key.

7.1 Mode 0 – Machine Configuration

This mode allows the machine configuration to be saved in novram, reset from novram, or set to the factory defaults. When this mode is entered the display shows 'SAVE CFG'. The BATCH key is then used to step through the options listed below. The required option is selected by pressing the START key, when the display will show 'donE'.

'SAVE CFG' – Save machine configuration in novram.
This saves the current machine setup in novram to provide a special configuration for the main user, to which the machine is set each time it is switched on.

'rESEt CFG' – Reset machine configuration from novram.
This resets the machine to the configuration previously stored in novram using the 'SAVE CFG' selection above, without having to switch the machine off.

'dEFLt CFG' – Set machine configuration to factory defaults.
This sets up the machine to the factory default configuration, without changing the special machine configuration stored in novram using the 'SAVE CFG' selection above.

The following list shows the machine configuration parameters retained in novram, with the factory settings.

Parameter	**Factory Default settings**
Stacker hopper linit	**100** notes
Size mode	**Auto** size
Denomination table pointer	**None** selected
Size detection mode (short edge, long edge or both)	**Full** size detection
Size detection level	**Longer** side only
Value mode	Value **OFF**
UV, MG, and Size detectors ON/OFF	All detectors **ON**
UV detector threshold	UV level **5**
Speed table pointers	**Max**imum speed
Speed table settings	**1500**, 1200, 1000, 500
Batch size table pointer	**Max**imum batch size
Batch size table settings	**100**, 50, 25, 20, 10, 5
Baud rate setting	**4800** baud

Note that in the following supervisor modes (except baud rate setting – mode 9), if the settings are changed, they are NOT stored in NOVRAM unless this supervisor mode is used to store them (i.e. 'SAVE CFG').

7.2 Mode 1 – Size Detector Mode for Value Operation (SD and 3D machines only)

This function allows the method of size determination to be selected from a menu. The display shows the currently selected mode when it is entered, and the SIZE key is used to step through the menu options. The displayed mode is selected when the TOTAL key is pressed to exit the supervisor mode.

If the selected size mode uses the denomination table and an error condition exists the display will flash 'tAbLE', i.e. there are conflicts in the denomination table size limits, or the fixed size denomination code points to an empty table location. This condition can only be cleared by pressing the START key, and the supervisor mode can then only be exited by selecting an alternative size mode.

Entry into this supervisor mode will be inhibited when the size detector is turned OFF, or there is no size detector (SD or 3D) fitted to the machine, or the machine is not in VALUE mode.

The size mode options are as follows:

'dEntr' – Denomination entry mode requires the note value to be manually entered, with auto–start deselected. It then operates in the same way as auto–size mode measuring the size of the first note and using the results together with the auto–size limits to set acceptance limits for the remaining notes in the bundle. this mode does not require the denomination table to function.

'FdEn xx' – Fixed denomination mode may be used when the table of note sizes contains notes of a similar size but with different denomination values. It can be used regardless of any overlaps in the note sizes. With this mode selected, two different operating processes are available which depend on whether 'autostart' has been selected or not.

With 'autostart' deselected

In this mode the display will show 'FdEn xx' when notes are placed on the feed hopper, where xx (= 1 to 20) is the current size table index. The denomination value corresponding to the size table index may be viewed on the display by pressing and holding the VALUE key and is indicated by a 'd' on the left of the display. Releasing the VALUE key returns the display to the size table index. At this point the size table index can be changed using the numerical keys and the CLEAR key, or the START key pressed to commence counting using the displayed size table pointer. This will be repeated each time the machine has stopped counting and notes are placed on the feed hopper with the autostart de–selected. Autostart may be selected before the START key is pressed to commence counting.
If the START or VALUE key are pressed with the size table index pointing at an empty location, the display will flash 'TAbLE'. Pressing the START key will return to the size table index display.

With 'autostart' selected
In this mode the machine commences counting as soon as notes are placed on the feed hopper, using the most recently entered size table index, or default if none has been entered, and will remain in this mode until autostart is deselected (while the machine is not counting). If notes are placed in the feed hopper with the current size table index pointing to an empty location, counting will not commence and an error will not be reported.

'AdEn' – Auto denomination mode measures the size of the first note and then compares the results with the size limits for each denomination table entry until it finds a match, where the matched size limits are then used as acceptance limits for the remaining notes in the bundle, and the corresponding note value in the table is then attributed to all the notes counted in the bundle. Auto denomination mode will be inhibited if there are conflicts in the denomination table size limits. (Refer to section on diagnostic 5).

'SPECL' – Mixed bundle mode measures the size of each note in a bundle and compares the results with the size limits for each denomination table entry until it finds a match, where the corresponding note value in the table is attributed to the note. Mixed bundle mode only operates with 3D detection and will be inhibited if there are mixed conflicts in the denomination table size limits. (Refer to section on diagnostic 5). When mixed bundle mode is selected and the supervisor mode exited, operation of the SIZE key will toggle between both long and short edge size detection selected and the size detector OFF. Individual long or short edge size detection remains disabled until the mixed bundle mode has been deselected.

7.3 Mode 3 – UV Detector Threshold Setting (UV machines only)

When supervisor mode 3 is entered, the BATCH display will show '–3–' and the COUNT display will show 'U_X' where the value of X is selected by pressing a 1 to 9 key. This diagnostic sets the level at which notes are detected as being UV Bright (1 – lowest level of brightness required for notes to be considered 'bright').

To exit the supervisor mode, press the TOTAL key.

7.4 Modes 4 and 5

Supervisor modes 4 and 5 have not been allocated.

7.5 Mode 6 – Select Stacker Hopper Limit

When this mode is selected the BATCH display will show '–6–'. The COUNT display will show the current stack limit and can be changed within the valid range of 50 to 200 by pressing the numeric keys.

To exit the supervisor mode, press the TOTAL key.

7.6 Modes 7 and 8

Supervisor modes 7 and 8 have not been allocated.

7.7 Mode 9 – CMS Serial On/Off Line Select (CMS machine only)

The On line/Off line switch only operates on machines which are logged on to a host system, and is a CMS controller function. Pressing the '0' key will switch the machine OFF LINE from the host system, when the display will indicate 'oFF LinE'. Pressing the '1' key will switch the machine ON LINE to the host system, when the display will indicate 'on LinE'.

To exit the supervisor mode, and write the displayed baud rate into the novram, press the TOTAL key. N.B. The baud rate setting will change only when the machine power is switched off and back on again.

7.8 Mode SPEED – Set Count Throughput Rate Table

When this mode is selected the display shows 'xxxx SPd' where xxxx is the currently selected throughput rate (eg. '1500 SPd') from the table. The SPEED key is used to step through the table values on the display (maximum 4). The displayed counting throughput rate may be changed using the numerical keys, then the START key pressed to enter the new counting throughput rate into the table. The counting throughput rates can be set in the range 600 to 1500, and are sorted in descending order if the counting rate entered is out of sequence. The display prompt changes from 'SPd' to 'Ent' whilst the new counting throughput rate is being entered.

To exit the supervisor mode press the TOTAL key.

7.9 Mode BATCH – Set Batch Size Table

When this mode is selected the display shows 'xxx bAt' where xxx is the currently selected batch size (eg. '100 bAt') from the table. The BATCH key is used to step through the table values on the display (maximum 6). The displayed batch size may be changed using the numerical keys, then the START key pressed to enter the new batch size into the table. The batch sizes can be set in the range 0 to 999, and are sorted in descending order if the counting speed entered is out of sequence. The display prompt changes from 'bAt' to 'Ent' whilst the new batch size is being entered.

To exit the supervisor mode press the TOTAL key.

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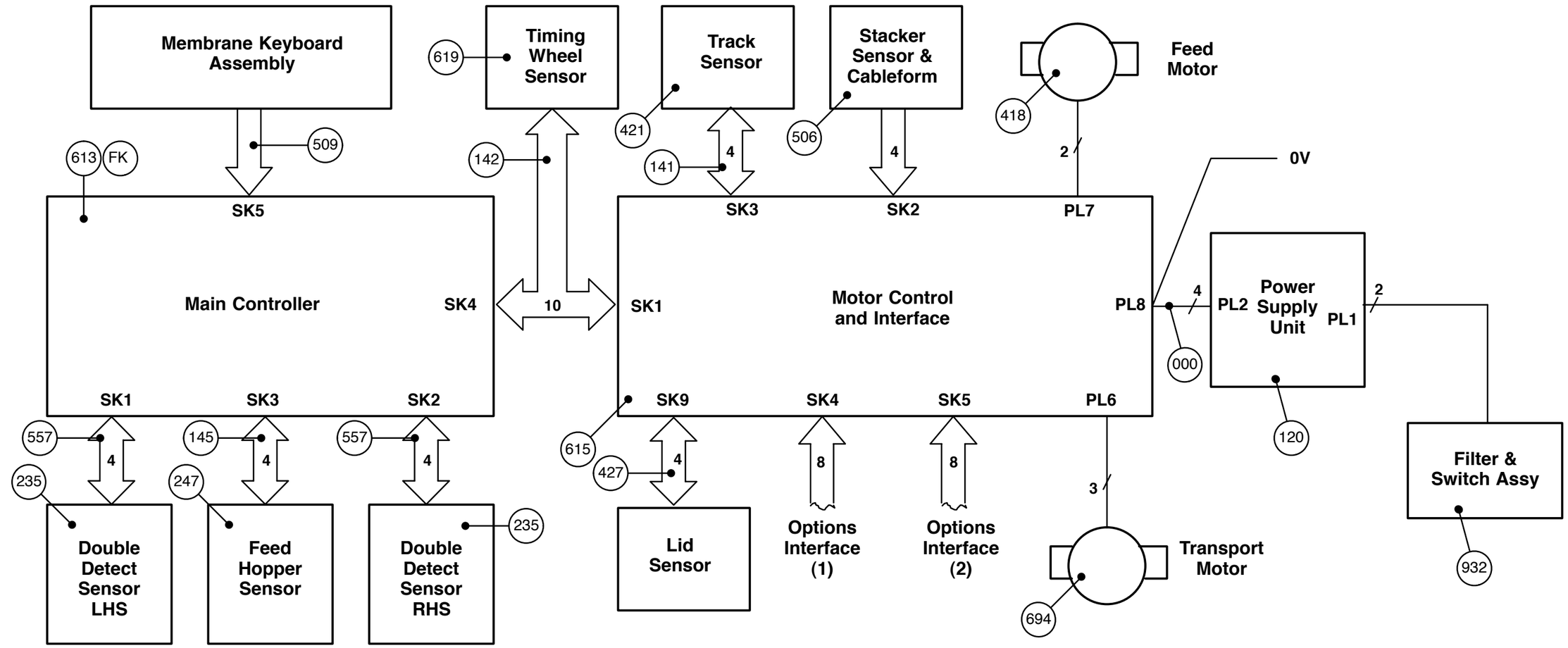

ITEM	DESCRIPTION	PART No.
120	PSU	02620415
141	Transport Sensor Cableform	2606000201
142	Main Controller Cableform	2606000301
145	Feed Sensor Cableform	2606000601
235	PCBP Double Detect	2609530701
247	Feed Hopper Sensor PCB	2609530801
418	Feed Motor Assy – Buhler B8	2602013201
421	PCBP Ref Track Sensor	2609535504
427	Cableform, Lid Open Sensor	2606004902

ITEM	DESCRIPTION	PART No.
506	Cableform Stacker Sensor B9	2606303602
509	2650 Membrane Panel Assembly – B9	2606303902
557	Doubles Detect Cableform	2606006401
613	PCBP Main Controller B9	2609536503
FK	2620 SDUVMGCMS S/W	FK1000059/04
615	Motor Control PCB Kit	2604534002
619	Timing Wheel Sensor PCB	2609536702
694	Transport Motor Kit	02510186
932	Filter & Switch Assembly	2606303705

ITEM	DESCRIPTION	PART No.
B9	Main Controller PCB Kit	2604536602
000	Cableform, PSU – A.B. Motor Control	2606006201
	Cordset Euro–Plug	02540414
	Cordset USA–Plug	02540415
	Cordset UK–Plug	02540516
	Cordset Australia/N.Z. – Plug	02540550
	Cordset India/S. Africa – Plug	02540630
	Cordset Israel – Plug	02540902

Figure 3. 2650 Interconnection Diagram

Appendix 3

26xx Euro Range IR Detector System (IRDS) or Level 1 (LV1)

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1. INTRODUCTION

The 2650 Euro range of machines have similarities with the 2650 machines discussed in other parts of this manual. The majority of the previous descriptions can be applied to the 2650 Euro range with differences highlighted in this appendix.

All machines in the range have:

- Fully variable speed control up to a maximum of 1500 notes per minute (throughput speed).
- Fully variable batching up to 999.
- Automatic and manual start/restart.
- 5 digit count display plus 3 digit batch display.
- Count with total facilities.
- Document thickness detector for identifying double, triple and overlapped notes.
- Value counting.
- RS232 type serial interface(s). (CMS – Cash Management System)

1.1 Options

The machine is capable of being fitted with the following options :

- LV1 detector with a combination of :
  - Size detection (short and/or long dimensions and doubles), 3D
  - IR detection.
  - Ultra Violet (Bright) detection (for photocopy paper detection).

2. MAIN SPECIFICATIONS

The mechanical and electrical specifications are as the 2010 machine with the following exception:

Note Counting Speed (Throughput rate)	1500 notes/min (Variable between 600 and 1500 notes/min in steps of 100 notes/min in 4 preset values).
Display	A 5 digit count display plus 3 digit batch display.
Stacker Capacity	200 notes max (programmable).

KEY TO FIGURE 1			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
426	FEED HOPPER ASSEMBLY B9 BLUE	2602313801	1
496	B9 2600 NOTE GUIDE SUPPORT	2614016001	1
571	2600 NOTE GUIDE D/A BLUE R/H	2602313401	1
572	2600 NOTE GUIDE D/A BLUE L/H	2602313501	1
606	SWITCH PANEL SPARES –2650 B9	see Figure 2	1

Note: Item 426 includes actuators, latches and warning label.

Note: Item 606 includes facia moulding, LCD gasket and switch panel as an assembly.

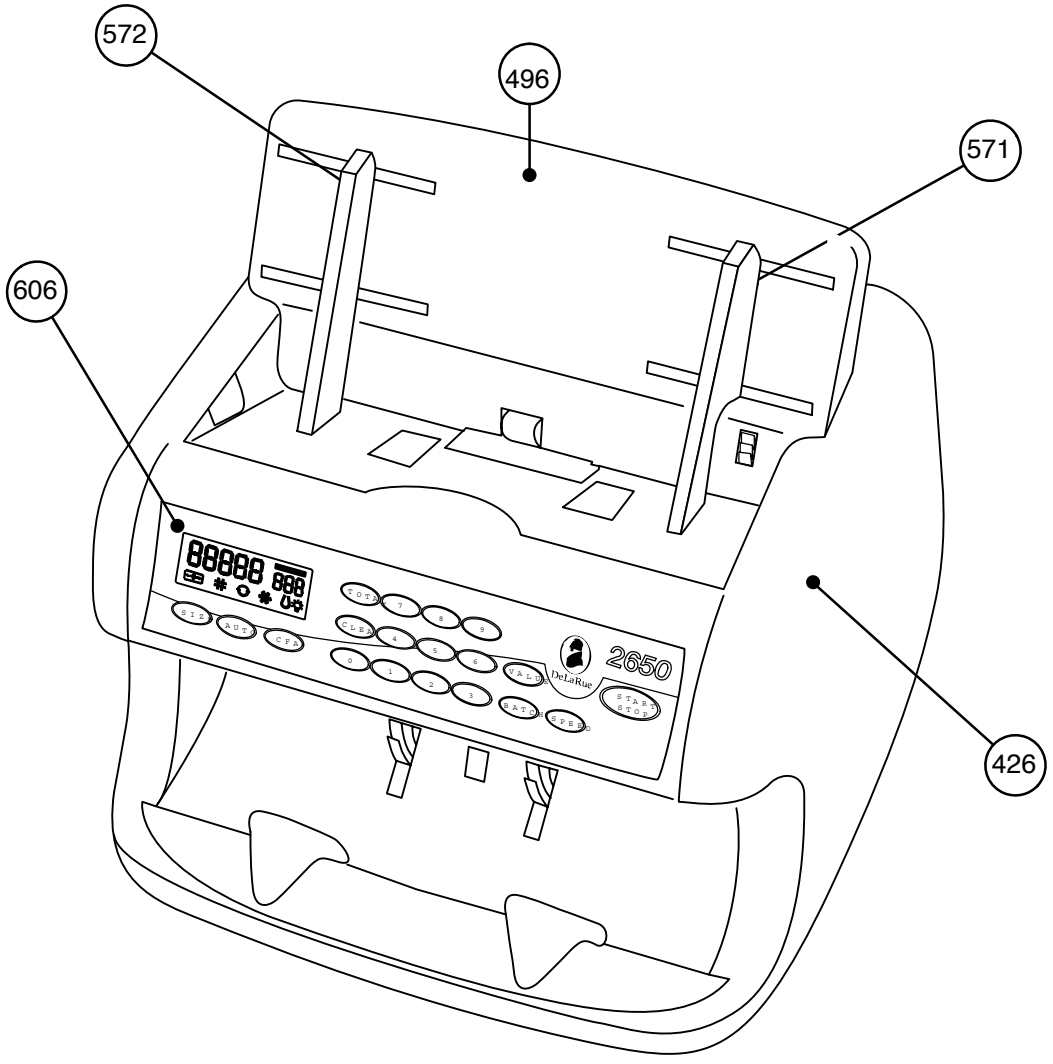
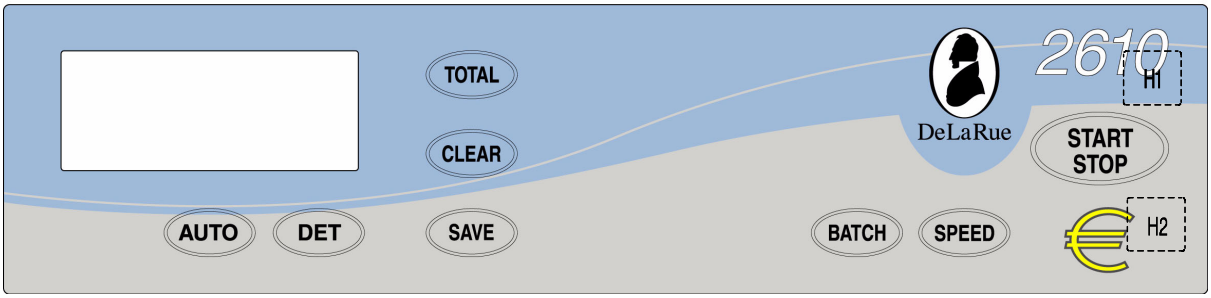


Figure 1. 2650 Euro Banknote Counter General View



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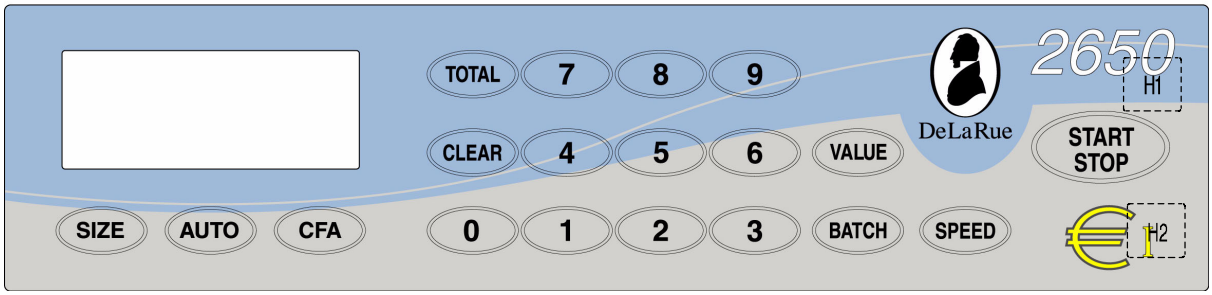
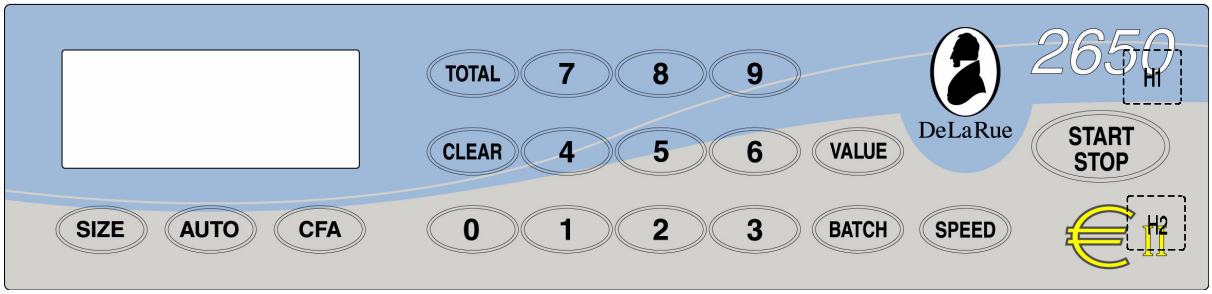


2603004001



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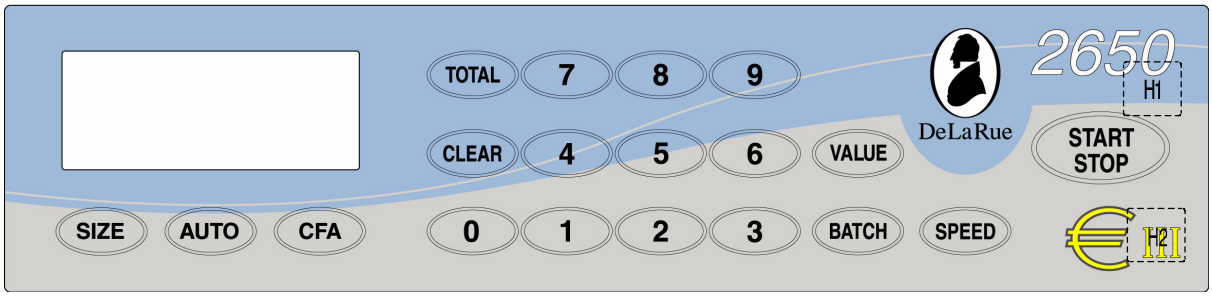


2603004201

Figure 2. 26xx Euro Control Panels

3. MECHANICAL DESCRIPTION

The mechanical description is identical to that given in Section 2 of the main manual, the only difference being that of the facia assembly.

4. ELECTRICAL DESCRIPTION

The electrical description is identical to that given in Section 3 of the main manual with the following differences:

- The main controller PCB provides an interface to the detector controller PCB, which is mounted in the detector box.
- The front panel display comprises a 5 digit count display plus a 3 digit batch display.
- The keypad is of membrane construction with a matrix of 21 keys (7 columns by 3 rows). The key layout is shown in paragraph 3.

SK5 – Membrane

Pin No	Remarks
1	Column 7 out
2	Column 6 out
3	Column 5 out
4	Column 4 out
5	Column 3 out
6	Column 2 out
7	Column 1 out
8	Row 3 in
9	Row 2 in
10	Row 1 in

An interconnection diagram for the 2650 machine is shown in Figure 4.

5. ERROR MESSAGES

Error messages displayed during machine operation include rEP, dEn, CF, FAUlt, JA, CLEAr, HALF, tAbLE, Err Prt, GULP, FEEd, Lid, CLEAn, UnCAL, Found, ibuS, CnS and Error. When some of these messages are displayed additional information about the type of error can be obtained by pressing the H1 key. To display the number of correctly counted notes prior to the error occuring press the H2 key. See Appendix 13 for details.

6. ENGINEER DIAGNOSTICS

Entry into engineer diagnostics is achieved by pressing and holding hidden key H1 then pressing the SIZE key (refer to Figure 2 for key location). In all diagnostic modes except 7 and 15, pressing the SIZE key once will return the machine to the diagnostic select mode, allowing another diagnostic function to be selected. Pressing the SIZE key while in the select mode causes a machine reset, returning it to normal operation. On entry into machine diagnostics, the following is shown on the count display:

'tESt'	–	for 1 second
'xxxx'	–	software version/revision for one second
'dn1'	–	diagnostics mode 1

The machine is now in the diagnostic select mode.
To select a particular diagnostic mode press the numeric keys for the required number.
The START key is used to enter the diagnostic mode selected and the SIZE key is used to exit from the diagnostic mode.
Note that if the machine exits from diagnostic mode with uncalibrated detectors the display will show 'UnCAL dEt'.

6.1 Diagnostic 0 – CRC, Version and Revision Numbers

Diagnostic mode 0 displays the CRC, Version and Revision numbers. On entry into this diagnostic mode the display shows the software version and revision. The CRC is displayed by pressing the zero key on the numeric keypad.

To exit base diagnostics press the SIZE key.

6.2 Diagnostic 1 – Sensor Check

Diagnostic mode 1 allows the operation of the following sensors to be checked:

- Stacker
- Transport – Note: for LV1 machines the Left and Right SD Detectors are used in place of the transport sensor.
- Feed
- Doubles Detect (left)
- Doubles Detect (right)

On entry into this diagnostic pressing the START key twice will run the transport at 1000 npm with the COUNT display showing '– – – – –' with no notes being fed, and with a correctly working machine.
If the stacker, Transport/Left or Right SD and feed sensors are blocked then unblocked in succession the display will change to '_ – – – –', '– _ – – –', '– – _ – –' and then back to '– – – – –' if all the sensors are working correctly.
If there is a fault or lack of correct calibration on either of the doubles detectors the display will show '– – – _ –' or '– – – – _' for the left and right detectors respectively. With the machine in this state, pressing the 0 or 1 keys will display the offset values in the 4th and 5th

character locations on the display for the left and right doubles detectors respectively.

Press the STOP key.
If a fault or lack of calibration is indicated the detector should be recalibrated prior to further diagnosis of the fault (see paragraph 6.3).
Press the SIZE key to exit.

6.3 Diagnostic 2 (d2) – Auto Double Detect Setting

Diagnostic mode 2 allows the doubles detect gain to be set automatically as follows:

When this mode is entered the display will show '00 – 00 o_ '. Place a pack of test notes* (149 x 80mm – Part No. 02390166) in the feed hopper and press the START key to start the setup cycle. The machine will feed 10 notes, make it's own adjustments and then feed another ten notes. The cycle will continue until either the machine runs out of notes or 3 consecutive batches of 10 are measured correctly within limits. The display shows 'xx – yy z _ _' where z is the number of batches of 10 with double detect in limits (0, 1, 2 or 3); xx is the LHS double detect level and yy is the RHS double detect level. The valid range of double detect levels is between 21 and 27.

* The test document is used in preference to an actual banknote due to its consistent note thickness. Using the incorrect document may result in an increased stop rate.

To exit to base diagnostics block the stacker sensor and press the SIZE key.

6.4 Diagnostic 3 – Autosize Lower Limit (short edge) (LV1 machines only)

Note: Each currency in the size table has it's own associated Auto Size Limits.

Diagnostic mode 3 sets the size lower limit (short edge dimension) individually, for each of the currencies available in the size table. When this diagnostic is entered the display shows Curr _ ccc , where 'ccc' indicates the first currency in the size table. E.g. Gbp
The available currencies may be scrolled through using the BATCH key. Once the required currency is displayed pressing the START key selects that currency's Short Edge Autosize Lower Limit for editing. The display will now show 'xxx Ent'. Where xxx represents the current size limit in tenths of a millimetre. Eg 30 = 3.0mm. This value may be edited using the numeric keypad. Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press the SIZE key to exit.

6.5 Diagnostic 4 – Autosize Upper Limit (short edge) (LV1 machines only)

Note: Each currency in the size table has it's own associated Auto Size Limits.

Diagnostic mode 4 sets the size upper limit (short edge dimension) individually, for each of the currencies available in the size table.

When this diagnostic is entered the display shows Curr _ ccc , where 'ccc' indicates the first currency in the size table. E.g. Gbp
The available currencies may be scrolled through using the BATCH key. Once the required currency is displayed, pressing the START key selects that currency's Short Edge Autosize Upper Limit for editing.
The display will now show 'xxx Ent', where xxx represents the current size limit in tenths of a millimetre. Eg 30 = 3.0mm. This value may be edited using the numeric keypad. Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press the SIZE key to exit.

Note: Note The values obtained in Diagnostic 3 and 4 are saved in non volatile memory and hence are retained when the machine is powered down.

6.6 Diagnostic 5 – Manual Programming of the Size/Denomination Table.

T.B.A. No manual size table entry at present.

6.7 Diagnostic 6 – Size Detector Calibration (LV 1 machines only – short edge dimension)

Diagnostic mode 6 is used to calibrate or test the short edge measurement of the size detector.
On entering this diagnostic 'Enter Len' will be displayed. At this stage it is possible to toggle between calibration mode or test mode.

Test Mode

a) While 'Enter Len' is displayed press the SIZE key to enter Test Mode; the display will show 'ready'. Place 100 notes (See Note*) on the feed hopper and press the START key. The display will show ' XXX yyy ', where XXX is the average left hand SD measurement and yyy is the average right hand measurement, in tenths of a mm.
Both left and right measurements should be within ±0.2mm of the actual note length.

b) Pressing the BATCH key will display 'XXX yy, where XXX is the average of both left and right detectors and yyy is the number of notes counted.

c) There is no option to save the calibration settings in Test mode. Press the SIZE key to exit diagnostic mode.

Calibration Mode

a) While 'Enter Len' is displayed use the numeric key pad to enter the actual short edge length of the calibration documents in tenths of a millimetre.
Press the START key

b) The display will show 'ready'. Place 100 notes (See Note*) on the feed hopper and press the START key. The documents will be fed through the machine.

c) The display will show 'c XXX yyy', where XXX is the average left hand SD measurement and yyy is the average right hand

measurement, in tenths of a mm. The c on the display signifies the machine is in calibration mode.
Both left and right measurements should be within ±0.2mm of the actual note length.

d) If not exit this diagnostic with the ”size key” and start diagnostic 6 again.

e) Once both values are within limits pressing the hidden key (H1) will display xxx yyy. (xxx = min, yyy = max right hand sensor measurements).
Where xxx & yyy should be the same as the note size entered with a tolerance of +/–10.
Pressing hidden key (H2) the dispaly will show xxx yyy, (xxx = min, yyy = max left hand sensor measurements).
Where xxx & yyy should be the same as the note size entered with a tolerance of +/–10.
If either is outside of tolerance exit the diagnostic with the size key and restart the calibration.

f) Press the TOTAL key and the display will show ‘save cal’. Pressing the START key at this time will save the calibration levels to NOVRAM. The display will show ‘buSy’ followed by ‘donE’. Press the SIZE key to return to diagnostics selection mode.

g) Pressing the SIZE key while ‘save cal’ is displayed will, abort the operation without saving the levels.

* The test document is used in preference to an actual banknote due to its consistent note size. Using the incorrect document may result in an increased stop rate.

6.8 Diagnostic 7 – Set Size Detector Control (LV1 machines only)

Diagnostic mode 7 allows the grade of size detection to be changed. When the mode is entered the display shows ‘dt_x’, where x = 1 or 2:

x = 1	The larger of the two sensor readings is required to be within limits (default setting).
x = 2	Both sensor readings are required to be within limits.

The value of x is selected using keys 1 or 2.

The detection level grade is not normally stored in non volatile memory and hence will be reset to the default value if the machine is reset (i.e. x = 1). However, if the START key is pressed at this point, the new grade will be stored in NOVRAM.

Press the SIZE key to exit.

6.9 Diagnostic 9 – View Output and Calibrate UV Detector (UV enabled LV1 machines only)

Note: Due to the potential hazard of the UV source, the UV detector will only operate with the detector box closed. If a red UV symbol is displayed with the detector box open, the machine should be switched off and returned for repair.

a. Fully open separator adjuster, (moving the adjuster wheel away from you)

b. To Calibrate the UV detector, use the following sequence:

Note: The UV detector calibration sequence should only be carried out when the machine has been powered up for at least two minutes.

c. On entering diagnostic mode 9 the display will show ‘EntEr doC’, which is a prompt to insert a Euro UV Calibration Document (Part Number 2620026301) into the machine,so that the Fs 5/uv position is aligned with the front edge of the detector box lid (as shown in fig 3). The document should be kept clean and stored in a light tight enclosure when not in use.

Note: The Euro UV Calibration document should be stored in the dark and only exposed to light for short periods whilst calibrating the machine. Failure to comply with this can affect document calibration.

Figure 3: Positioning for UV Calibration Document

Note: Mode 9 should be set after 12

d. Enter the UV setting number for the calibration document using the numeric keys and then press the START key. In the example shown in the photograph, the value 35 would be entered.

e. The display will show ‘buSY’ while the UV calibration is in progress. When successfully complete the display will show ‘donE’. Otherwise if the calibration is unsuccessful the display will show ‘FaIL’.

f. Press the SIZE key to exit.

g. Open lid.

h. Remove the calibration document.

i. Close lid.

j. Reset the separator adjuster knob to normal running position.

6.10 Diagnostic 10 – CMS Configuration Parameters

This diagnostic mode is used to change the two RS232 interface configuration parameters for CMS/Printer operation and includes Baud Rate, Stop Bits, Parity Mode and Data Bits selection.

On entering this mode the selected channel (port) is displayed.
The options are :

1 ch	for the left (cms) port
2 ch	for the right port

(as viewed from the rear of the machine)

The channel can be toggled from 1 to 2 using the BATCH key.

Note: Only channel 1 is available at this time, Channel 2 is reserved for future enhancements

Press the start key while '1 ch' is displayed to select channel 1.
'0 PRO' is displayed. To view the available protocols press the BATCH key.
Pressing the START key while the required protocol is displayed will select it.

Note: This option is for future enhancements and only protocol 0 is available. Selecting another will cause a flashing 'E' to be displayed, indicating an incorrect selection.

a. Baud Rate Selection

The display will now show the current baud rate with BAU indicated on the RHS.

e.g. 9600 bAU

The baud rate options are 1200, 2400, 4800, 9600, 19200 and 38400, where 9600 is the factory default.

Press the BATCH key repeatedly to scroll round the baud rate options on the display, and press the START key to enter the selected baud rate.

b. Number of Data Bits Selection.

The display shows the current number of data bits with dAt indicated on the RHS.

e.g. 7 dAt

The number of data bits can be set to either 7 or 8, where the factory default is 7 data bits.

Press the BATCH key to change the number of data bits on the display, and press the START key to enter the selected number of data bits.

c. Parity Mode Selection.

The display shows the current parity mode with PAr indicated on the RHS.

e.g. EvEn Par

The parity mode options are NonE, odd, and EvEn, where the factory default is EvEn parity.

Note: Only valid Parity modes will be available based on the number of data bits selected.

Press the BATCH key repeatedly to scroll round the parity mode options and press the START key to enter the selected parity. The display will then move on to the stop bit selection.

d. Number of Stop Bits Selection.

The display shows the current number of stop bits with StP indicated on the RHS.

e.g. 1 StP

The number of stop bits can be set to either 1 or 2, where the factory default is 1 stop bit.

Press the BATCH key to change the number of stop bits on the display, and press the START key to enter the selected number of stop bits.

e. The display will then return to the Channel selection.

Pressing the SIZE key will show 'Save' on the display.

At this point the following options are available:

i. Press the START key to save the settings; the display will show 'busy' followed by 'done'. Press the SIZE key to return to diagnostic selection mode.

ii. Pressing the BATCH key will display 'deFLt'. Press the START key to reload the factory default CMS setting. Press SIZE to return to diagnostic selection.

iii. Press the SIZE key to quit the save and return to diagnostics selection.

6.11 Diagnostic 11 – Superior Magnetics Detector System T.B.A.

6.12 Diagnostic 12 – IR Detector Calibration

Ensure IRSD Calibration Document is in a good and clean condition.

a. Verify that the note adjuster is set to position 3.

b. Press Hidden Key H1 and the Size button. The display will show dn

c. Enter the keypad numbers 12. Press the Start/Stop button. The display will show Ready FS1.

d. Press the Start/Stop button. The display will show busy FS1.

e. Press the Start/Stop button. The display will show 'EntEr doC' which is a prompt to insert the IRSD Calibration Document (2620026301) into the machine.

f. Insert the document until the line DOC (FS2) is in line with the detector box lid (see Figure 4). If the document is inserted too far do not pull back out, open lid and re–insert. Enter the IR setting number for the calibration document using the number keys and then press the start key. In the example shown in the photograph the value 189 would be entered.

g. Press the Start/Stop button the display will show busy FS2 then ready FS3.

h. Insert the document further into the machine until the line FS3 is in line with the detector box lid.

i. Press the Start/Stop button the display will show busy FS3 then ready FS4.

j. Insert the document further into the machine until the line FS4 is in line with the detector box lid.

k. Repeat above for FS5 display will then show done. Do not remove the document at this stage.

l. Press the Size key to exit.

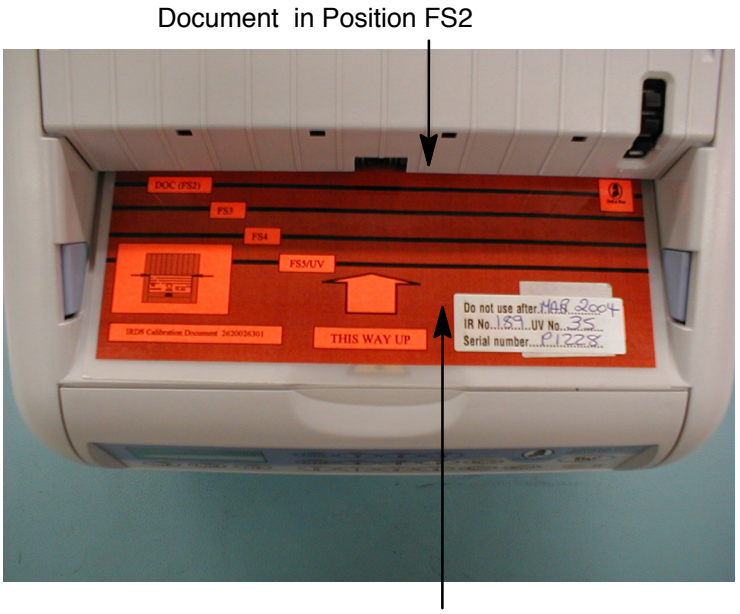


Figure 4. Positioning for IR Calibration Document

6.13 Diagnostic 13 – Cycling of Motors

Diagnostic mode 13 cycles the machine motors as if batching 100 notes, continuously. It is not intended for heavy use which would result in rapid wear occurring.

Press the START/STOP key to start or stop the cycle and select 'Auto' for continuous operation.

FO, tO indicates feed and transport motors off, F1, t1 motors on. Press the SIZE key to exit.

6.14 Diagnostic 14 – Initialise Non Volatile Memory

Entry into diagnostic mode 14 sets the main controller non volatile memory to the default values. Press the START key, the display will show ‘SEt’. Press the START key again, the display will show ‘donE’.

If the machine is unable to set the non volatile memory, the display shows ‘FAIL’.

Press the SIZE key to exit.

Note: The Doubles Detector will require resetting after this operation, see diagnostic 2. The Default CMS Protocol, Count Speed, Operation Mode, Detector Selection and Detector Levels will also have be loaded. However, all other detector calibrations will remain unaffected.

6.15 Diagnostic 15 – Set Count Speed

*Note: This diagnostic sets the transport speed, **not** the throughput rate. A throughput rate of 1500 n.p.m. is equivalent to a transport speed of approximately 1800 n.p.m.*

Diagnostic mode 15 enables the note count speed to be altered. When the mode is entered, the COUNT display shows the note count speed in notes per minute (npm). The speed is changed by entering the required speed using the numeric keys (valid range 400 to 2500 npm) or you may toggle through the default speed with the SPEED key. Use the SIZE key exit from this diagnostic, back to base diagnostics, further diagnostic functions will now run at the selected speed.

Pressing the SIZE key again to exit to normal operation, will reset the speed to that on entry to the diagnostics.

6.16 Diagnostic 16 – Initialise Detector Controller Non Volatile Memory

On entry into diagnostic mode 16 the machine will display ‘rEAdY’. On pressing the START key the machine will display ‘buSY’ and then ‘donE’ when the initialisation is complete (or ‘FAIL’ if unsuccessful). Pressing the SIZE key will then exit from the diagnostic.

Note: LV1 Machines:
All Detector Calibrations, Size Table Data and Currency Information will be cleared. The CMS settings will be restored to the factory default.

Note: LV 2 Machines:
T.B.A.

6.17 Diagnostic 22 – Size Detector Calibration (LV 1 machines only – long edge dimension)

Note: Diagnostic mode 6 and diagnostic mode 12 must be completed before proceeding with diagnostic 22).

Diagnostic mode 22 is used to calibrate or test the long edge measurement of the size detector. Good condition £5 size notes are required for this procedure.

On entering this diagnostic 'Enter Len' is displayed. At this stage it is possible to toggle between calibration mode or test mode using the ''size key''.

Test Mode

a) While 'Enter Len is displayed press the SIZE key to enter TEST MODE. The display will show 'ready. Place 100 notes (See Note*) on the feed hopper and press the START key. The display will show 'XXX yyy ', where XXX is the long edge measurement, in tenths of a mm and yyy is the number of notes counted.
The long edge measurements should be within ±0.3mm of the actual note length.

b) There is no option to save the calibration settings in Test mode. To exit the diagnostic by press the SIZE key.

Calibration Mode

a) While 'Enter Len' is displayed use the numeric key pad to enter the actual long edge length of the calibration documents in tenths of a millimetre.
Press the START key

b) The display will show 'ready'. Place 100 notes (See Note*) on the feed hopper and press the START key. The documents will be fed through the machine.
The display will show 'c XXX yyy', where XXX is the long edge measurement, in tenths of a mm and yyy is the number of notes counted.

c) The c on the display signifies the machine is in calibration mode. The long edge measurements should be within ±0.3mm of the actual note length.
Press hidden key H1. Display will show xxxx. xxxx should be the same as the note size entered with a tolerance of +10.
Press hidden key H2. Display will show xxxx. xxxx should be the same as the note size entered with a tolerance of –10

d) If any measurement is outside tolerance exit the Diagnostic and start again.

e) Press the TOTAL key, the display will show 'save cal'. Pressing the START key at this time will save the calibration levels to NOVRAM. The display will show 'buSy' followed by 'donE'.
Press the SIZE key to return to diagnostics selection mode.

f) Pressing the SIZE while 'save cal' is displayed will abort the operation without saving the levels.

* The test document is used in preference to an actual banknote due to its consistent note size. Using the incorrect document may result in an increased stop rate.

6.18 Diagnostic 23 – Autosize Lower Limit (long edge) (LV1 machines only)

Note: Each currency in the size table has it's own associated Auto Size Limits.

Diagnostic mode 23 sets the autosize lower limits (long edge dimension) individually, for each of the currencies available in the size table. When this diagnostic is entered the display shows 'Curr _ ccc', where 'ccc' indicates the first currency in the size table, e.g. Gbp . The available currencies may be scrolled through using the BATCH key. Once the required currency is displayed pressing the START key selects that currency's Long Edge Autosize Lower Limit for editing. The display will now show 'xxx Ent', where xxx represents the current size limit in tenths of a millimetre, e.g. 30 = 3.0mm. This value may be edited using the numeric keypad. Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press the SIZE key to exit.

6.19 Diagnostic 24 – Autosize Upper Limit (long edge) (LV 1 machines only)

Note: Each currency in the size table has it's own associated Auto Size Limits.

Diagnostic mode 24 sets the autosize upper limits (long edge dimension) individually, for each of the currencies available in the size table. When this diagnostic is entered the display shows 'Curr _ ccc', where 'ccc' indicates the first currency in the size table, e.g. Gbp. The available currencies may be scrolled through using the BATCH key. Once the required currency is displayed pressing the START key selects that currency's Long Edge Autosize Upper Limit for editing. The display will now show 'xxx Ent', where xxx represents the current size limit in tenths of a millimetre, e.g. 30 = 3.0mm. This value may be edited using the numeric keypad. Once the correct autosize limit has been entered, press the START key. The display will change to show 'buSy', followed by 'donE' when the machine update has been completed. Press the SIZE key to exit.

Note: The values obtained in Diagnostic 23 and 24 are saved in non volatile memory and hence are retained when the machine is powered down.

6.20 Diagnostic 45 – Totals Stored in NOVRAM

Diagnostic 45 allows the background totals stored in novram to be displayed. On entry into diagnostic mode 45 the machine will display the total number of notes counted. Use the numeric keypad to select the other totals:

0 = Total notes

1 = Total rEPs (repeated notes in stacker)

2 = Total CF's (detector errors – machines fitted with additional detectors only)

3 = Total dEn's (size error detections)

4 = Total jams

The NOVRAM totals can be reset by pressing and holding the TOTAL key and then pressing the CLEAR key.
Press the SIZE key to exit.

7. SUPERVISOR FUNCTIONS

A supervisor mode of operation is provided to enable the operator to change various machine set up parameters.

Entry into the supervisor mode is achieved by pressing and holding the TOTAL key and then pressing a numeric key (0 to 9), the BATCH or SPEED key to enter the required supervisor mode. Generally the selected supervisor mode is shown on the BATCH display whilst the control information is shown on the COUNT display.

To exit the supervisor mode, press the TOTAL key.

7.1 Mode 0 – Machine Configuration

This mode allows the machine configuration to be saved in novram, reset from novram, or set to the factory defaults. When this mode is entered the display shows 'SAVE CFG'. The BATCH key is then used to step through the options listed below. The required option is selected by pressing the START key, when the display will show 'donE'.

'SAVE CFG' – Save machine configuration in novram.
This saves the current machine setup in novram to provide a special configuration for the main user, to which the machine is set each time it is switched on.

'rESEt CFG' – Reset machine configuration from novram.
This resets the machine to the configuration previously stored in novram using the 'SAVE CFG' selection above, without having to switch the machine off.

'dEFLt CFG' – Set machine configuration to factory defaults.
This sets up the machine to the factory default configuration, without changing the special machine configuration stored in novram using the 'SAVE CFG' selection above.

The following list shows the machine configuration parameters retained in novram, with the factory settings.

Parameter	**Factory Default settings**
Stacker hopper linit	**100** notes
Size mode	**Auto** size
Denomination table pointer	**None** selected
Size detection mode (LV1 only)	**Full** size detection
Size detection level (SD)	**Longer** side only
Value mode	Value **OFF**
LV1 & LV2 detectors ON/OFF	All detectors **ON**
UV detector threshold	UV level **5**
IR detector threshold	IR level **5**
Foil detector threshold	Foil level **5**

Speed table pointers	**1500**
Speed table settings	**1500**, 1200, 1000, 500
Batch size table pointer	**100**
Batch size table settings	**100**, 50, 25, 20, 10, 5

Note that in the following supervisor modes if the settings are changed, they are NOT stored in NOVRAM unless this supervisor mode is used to store them (i.e. 'SAVE CFG').

7.2 Mode 1 – Size Detector Mode for Value Operation (LV1 machines only)

This function allows the method of size determination to be selected from a menu. The display shows the currently selected mode when it is entered, and the SIZE key is used to step through the menu options. The displayed mode is selected when the TOTAL key is pressed to exit the supervisor mode.

If the selected size mode uses the denomination table and an error condition exists the display will flash 'tAbLE', i.e. there are conflicts in the denomination table size limits, or the fixed size denomination code points to an empty table location. This condition can only be cleared by pressing the START key, and the supervisor mode can then only be exited by selecting an alternative size mode.

Entry into this supervisor mode will be inhibited when the size detector is turned OFF, or there is no size detector (SD or 3D) fitted to the machine, or the machine is not in VALUE mode.

The size mode options are as follows:

'dEntr' – Denomination entry mode requires the note value to be manually entered, with auto–start deselected. It then operates in the same way as auto–size mode measuring the size of the first note and using the results together with the auto–size limits to set acceptance limits for the remaining notes in the bundle. this mode does not require the denomination table to function.

'FdEn xx' – Fixed denomination mode may be used when the table of note sizes contains notes of a similar size but with different denomination values. It can be used regardless of any overlaps in the note sizes. With this mode selected, two different operating processes are available which depend on whether 'autostart' has been selected or not.

Fden operation With 'autostart' deselected

In this mode the display will show 'FdEn xx' when notes are placed on the feed hopper, where xx (= 1 to 20) is the current size table index. The denomination value corresponding to the size table index may be viewed on the display by pressing and holding the VALUE key and is indicated by a 'd' on the left of the display. Releasing the VALUE key returns the display to the size table index. At this point the size table index can be changed using the numerical keys and the CLEAR key, or the START key pressed to commence counting using the displayed size table pointer. This will be repeated each time the machine has stopped counting and notes are placed on the feed hopper with the

autostart de-selected. Autostart may be selected before the START key is pressed to commence counting.
If the START or VALUE key are pressed with the size table index pointing at an empty location, the display will flash 'TAbLE'. Pressing the START key will return to the size table index display.

Fden operation With 'autostart' selected
In this mode the machine commences counting as soon as notes are placed on the feed hopper, using the most recently entered size table index, or default if none has been entered, and will remain in this mode until autostart is deselected (while the machine is not counting). If notes are placed in the feed hopper with the current size table index pointing to an empty location, counting will not commence and an error will not be reported.

'AdEn' - Auto denomination mode measures the size of the first note and then compares the results with the size limits for each denomination table entry until it finds a match. The matched size limits are then used as acceptance limits for the remaining notes in the bundle, and the corresponding note value in the table is then attributed to all the notes counted in the bundle. Auto denomination mode will be inhibited if there are conflicts in the denomination table size limits. (Refer to section on diagnostic 5).

'SPECL' - Mixed bundle mode measures the size of each note in a bundle and compares the results with the size limits for each denomination table entry until it finds a match, where the corresponding note value in the table is attributed to the note. Mixed bundle mode only operates with 3D detection and will be inhibited if there are mixed conflicts in the denomination table size limits. (Refer to section on diagnostic 5). When mixed bundle mode is selected and the supervisor mode exited, operation of the SIZE key will toggle between both long and short edge size detection selected and the size detector OFF. Individual long or short edge size detection remains disabled until the mixed bundle mode has been deselected.

7.3 Mode 3 - UV Detector Threshold Setting (UV machines only)

When supervisor mode 3 is entered, the BATCH display will show '-3-' and the COUNT display will show 'U_X' where the value of X is selected by pressing a 1 to 9 key. This diagnostic sets the level at which notes are detected as being UV Bright (1 - lowest level of brightness required for notes to be considered 'bright').

To exit the supervisor mode, press the TOTAL key.

7.4 Modes 4

Supervisor mode 4 has not been allocated.

7.5 Mode 5 - IR and Foil Detector Threshold and Foil Setting (IR machines only)

When supervisor mode 5 is entered, the BATCH display will show '-5-' and the COUNT display will show ir_X' where the value of X is selected by pressing a 1 to 9 key. This diagnostic sets the level at

which notes are detected as having IR features (1 – lowest level of brightness required for notes to be considered ‘bright’).
When supervisor mode 5 is entered followed by pressing the batch key the BATCH display will show ’–5–’ and the COUNT display will show ’F_X’ where the value of X is selected by pressing a 1 to 9 key. This diagnostic sets the level at which notes are detected as having foil features (1 – lowest level required for notes to be considered to have foil).

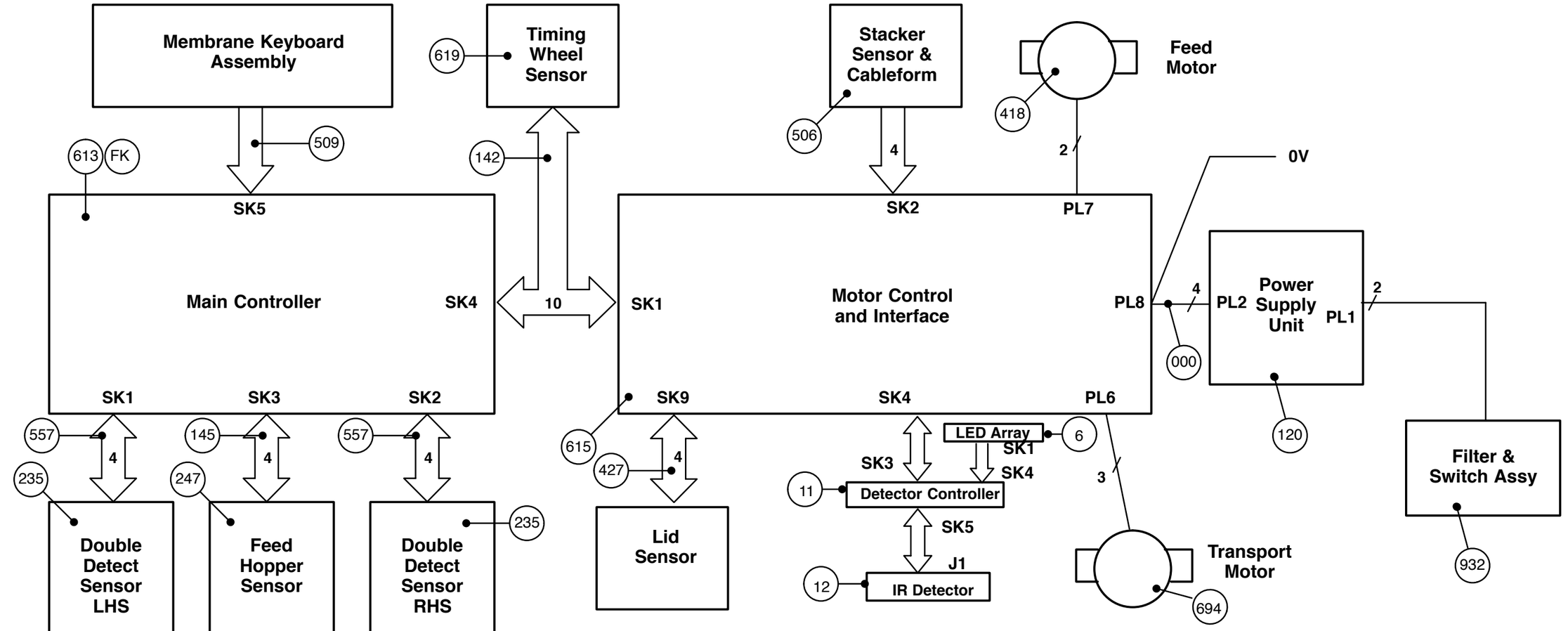
7.6 Mode 6 – Select Stacker Hopper Limit

When this mode is selected the BATCH display will show ‘–6–’. The COUNT display will show the current stack limit and can be changed within the valid range of 50 to 200 by pressing the numeric keys.

To exit the supervisor mode, press the TOTAL key.

7.7 Modes 7 and 8

Supervisor modes 7 ,8 and 9 have not been allocated.



ITEM	DESCRIPTION	PART No.
120	PSU	02620415
142	Main Controller Cableform	2606000301
145	Feed Sensor Cableform	2606000601
235	PCBP Double Detect	2609530701
247	Feed Hopper Sensor PCB	2609530801
418	Feed Motor Assy – Buhler B8	2602013201
427	Cableform, Lid Open Sensor	2606004902
506	Cableform Stacker Sensor B9	2606303602
509	2620 Membrane Panel Assembly – B9	see Figure 2
557	Doubles Detect Cableform	2606006401

ITEM	DESCRIPTION	PART No.
613	PCBP Main Controller B9	2609536503
FK	2650 Euro Range	FK100059/04
615	Motor Control PCB Kit Euro	2604540002
619	Timing Wheel Sensor PCB B8	2609536702
694	Transport Motor Kit	02510186
932	Filter & Switch Assembly	2606303705
6	IR LED Array	2602310802
11	Detector Controller PCB – €I+	2603004301
11	Detector Controller PCB – €Ir	2603004401
11	Detector Controller PCB – €II	2603004501

ITEM	DESCRIPTION	PART No.
11	Detector Controller PCB – €II+	2603004601
12	RDS Detector PCB	S3–2609539904
000	Cableform, PSU – A.B. Motor Control	2606006201
	Cordset Euro–Plug	02540414
	Cordset USA–Plug	02540415
	Cordset UK–Plug	02540516
	Cordset Australia/N.Z. – Plug	02540550
	Cordset India/S. Africa – Plug	02540630
	Cordset Israel – Plug	02540902

Figure 1: 2650 €I + €II IRDS Interconnection Diagram

Appendix 4

2650 Euro Range SMDS Detector or Level 2 (LV2)

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Illustrations

Figure 1 2650 €III Interconnection Diagram 13

1. INTRODUCTION

The Superior Magnetic Detection System (SMDS) provides both counterfeit and value information. The detector covers a large portion of the note's area and identifies denomination specific magnetic data held within the note.

The detector head is divided into a number of regions, each of which is scanned by a DSP. The resulting signals are then sent to the detector controller for analysis.

Once the detector controller receives the data, identification and authentification procedures are carried out. If an invalid note is identified the machine stops and error message is passed to the main controller.

2. MAIN SPECIFICATION

The mechanical and electrical specifications are as the 2010 machine with the following exception:

Note Counting Speed (throughput rates)	1500 notes/min (Variable between 600 and 1500 notes/min in steps of 100 notes/min in 4 preset values.

Display a 5 digit count display plus 3–digit batch display. Stacker Capacity 200 notes max (programmable).

3. MECHANICAL DESCRIPTION

The mechanical description is identical to that given in Section 2 of the main manual, the only difference being that of the fascia assembly, chassis and detector box.

4. ELECTRICAL DESCRIPTION

The electrical description is identical to that given in Section 3 of the main manual with the following differences:

- The main controller PCB provides an interface to the detector controller PCB, which is mounted in the detector box.
- The front panel display comprises a 5 digit count display plus a 3 digit batch display.
- The keypad is of membrane construction with a matrix of 21 keys (7 columns by 3 rows). The key layout is shown in Appendix 2,paragraph 4.

SK5 – Membrane

Pin No	Remarks
1	Column 7 out
2	Column 6 out
3	Column 5 out
4	Column 4 out
5	Column 3 out
6	Column 2 out
7	Column 1 out
8	Row 3 in
9	Row 2 in
10	Row 1 in

An interconnection diagram for the 2650 €III machine is shown in Figure 1.

5. ERROR MESSAGES

Error messages displayed during machine operation include rEP, dEn, CF, FAUlt, JA, CLEAr, HALF, tAbLE, Err Prt, GULP, FEEd, Lid, CLEAn, UnCAL, Found, ibuS, CnS and Error. When some of these messages are displayed additional information about the type of error can be obtained by pressing the H1 key. To display the number of correctly counted notes prior to the error occuring press the H2 key. See Appendix 13 for details.

6. ENGINEER DIAGNOSTICS

Engineering diagnostics are entered in the same manner as the 2650 €I & €II. The diagnostics are the same with the exclusion of diagnostic 3,4,9,12,22,23 and 24, which are not used by this detector variant.

New diagnostics “DN 6”, “ DN 11” and “DN25” have been introduced and are detailed below:

6.1 Diagnostic 6

Either good condition €20 notes or similarly sized test notes should be used for this calibration.

Diagnostic 6 has been added to check the average note length measured at the track sensor, and to calibrate the timing wheel scaling factor.

The diagnostic displays the average note length while a bundle of notes is being counted and at the end of the count.

Count a bundle of 100 good condition test notes,The average length measurement will be displayed.

Carry out the following procedure to improve the accuracy of the average note length measurement.

Press the TOTAL key after obtaining an average note length with an average count of more than 50 notes, and the display will show ‘EntEr Len’.

Enter the actual length of the notes counted using the numerical keys and then press the START key. The display will show ‘BUSY with the # icon flashing while the timing wheel length is being rescaled and stored in the machine configuration memory. If the difference between the actual note length and average note length is too large ‘Error’ will appear on the display and the rescaling will not be carried out.

Re–feed the note bundle after rescaling the timing wheel length, and verify that the average note length is closer to the actual note length, and repeat the rescale operation with the TOTAL key until the average note length is within +/– 0.5mm of the of the actual note length.

Note: That the displayed and entered note lengths are in 0.1mm. (e.g. An 80mm note would be displayed or entered as 800).

Press the “Size” key to exit this diagnostic.

6.2 Diagnostic 11

Diagnostic 11 consists of a three–part test, which is used to ensure the detector is setup and functioning correctly.

a. Diagnostic test a:

- The 2650 will display ‘rEAdY td1’, on entry into diagnostic 11.
- Press the AUTO key to automatically start the feeder when notes are placed on the feed hopper.
- Feed a single non–magnetic document. The 2650 will count the document.

or

- ‘PASS td1’ when the test has been completed successfully, or ‘xxx FA1’ when the test has failed, where ‘xxx’ is a bit array containing the failed heads (in hex).
- Press the BATCH key repeatedly to interrogate, which channels have failed, indicated by CH_(number) on the LHS display.
- Press the VALUE key to interrogate the test results, as described in paragraph 6.2.5.
- Press START key to proceed with diagnostic test 3.

b. Diagnostic test b:

Diagnostic test 2 checks the magnetic signal level,and number of magnetic event measured on each channel using a striped magnetic test document.

- 2650 will display ’rEAdY td2’
- Feed a single four striped magnetic test document. The 2650 will count the document.

- 2650 will display either 'PASS td2', or'xxx FA2' for failed test, where 'xxx' is a bit array containing the field heads (in hex).
- Press the BATCH key repeatedly to interrogate which channels have failed, indicated by CH (channel) on the LHS display.
- Press the VALUE key to interrogate the test results, as described in paragraph 6.2.5
- Press START key to proceed with diagnostic test 3.

c. Diagnostic test c:

Diagnostic test 3 checks the communications between the DSP and detector controlleron each channel while test notes are being fed.

- 2650 will display 'rEAdY td3'.
- Feed a minimum of twelve plain test notes. The 2650 will count the notes.
- 2650 will display either 'PASS td3', or 'xxx FA3' for a failed test, where 'xxx' is a bit array containing the failed heads (in hex).
- Press the VALUE key to interrogate the test results, as described in paragraph 6.2.5.
- Press START key to proceed with a live currency test.

d. Live currency test:

The live currency test will verify that the 2650 EIII recognises live Euro currency.

- 2650 will display 'Curr_ Eur', (pressing the BATCH will change to a different currency, if installed).
- Press START key to enter diagnostic count mode.
- Feed a bundle of Euro notes. The 2650 will count the notes.
- 2650 will display the number of authenticated notes on the 'count' display, with the total count on the 'batch' display. If the two totals are not the same, the test has failed.

This completes the basic test

e. Interrogative mode:

- The count display will indicate the result value in hex, and the batch display will indicate the result type and channel number.
- Use the hidden keys or numerical keys to select the channel number 0 to 11.
- Use the BATCH key to select the result type, as follows;

  t threshold level (all documents).
  n average noise level (non–magnetic test documents).
  P peak noise level (non–magnetic test documents).
  A average peak level (magnetic striped documents).
  c number of magnetic events (magnetic striped

documents).

L static analogue level (under static conditions).

o offset level (all documents).

Press the “Size” key to exit this diagnostic.

6.3 Diagnostic 25

a. Diagnostic 25 – Additional diagnostic to evaluate note skew and inter–note gap.

Diagnostic 25 has been added to check the note skew and inter–note gap, in order to optimise the feed performance by adjusting the separator gap.

A bundle of 100 notes are required for the test. The notes used for the test should not have greater than 1mm damaged edges or edge folds, because these would invalidate the skew measurement.

Feed the bundle of 100 notes, which will be counted on the BATCH display while the averages are updated on the COUNT display.

b. Skew display mode.

On entry diagnostic 25 will be in average skew display mode with the BATCH bar ON, where the BATCH display shows the number of notes counted in the bundle, and the COUNT display show the average left and right skew measured on the notes at the double detect sensor.

Check the left and right skew averages are less than 3

Press the VALUE key, and the COUNT display will flash the maximum left and right skew measured on the notes at the double detect. Both the maximum skew measurements must be less than 5.

Displayed skew value	Skew angle (degrees)
0	0
1	3.9
2	7.8
3	11.5
4	15.3
5	19.0
6	22.5
7	25.5
8	28.6

The “BATCH” key is used to toggle to the inter–note gap display mode.

c. Inter–note gap display mode.

The average inter–note gap display mode is with the BATCH bar OFF, where the BATCH display shows the number of notes counted in the

bundle, and the COUNT display show the average inter–note gap measured between the notes at the track sensor.

Press the VALUE key, and the COUNT display will flash the minimum inter–note gap measured at the track sensor.

Check the inter–note gap average is between 30 and 34, and that the minimum inter–note gap is greater than 26.

Note: The left and right skew and inter–note gap are measured in timing wheel counts intervals, where 1 count = 4.42mm.

7. SUPERVISOR FUNCTIONS

A supervisor mode of operation is provided to enable the operator to change various machine set up parameters.

Entry into the supervisor mode is achieved by pressing and holding the TOTAL key and then pressing a numeric key (0 to 9), the BATCH or SPEED key to enter the required supervisor mode. Generally the selected supervisor mode is shown on the BATCH display whilst thecontrol information is shown on the COUNT display

To exit the supervisor mode, press the TOTAL key.

7.1 Mode 0 – Machine Configuration

This mode allows the machine configuration to be saved in novram, reset from novram, or set to the factory defaults. When this mode is entered the display shows 'SAVE CFG'. The BATCH key is then used to step through the options listed below. The required option isselected by pressing the START key, when the display will show 'donE'.

'SAVE CFG' – Save machine configuration in novram.
This saves the current machine setup in novram to provide a special configuration for the main user, to which the machine is set each time it is switched on.

'rESEt CFG' – Reset machine configuration from novram.
This resets the machine to the configuration previously stored innovram using the 'SAVE CFG' selection above, without having toswitch the machine off.

'dEFLt CFG' – Set machine configuration to factory defaults.
This sets up the machine to the factory default configuration,without changing the special machine configuration stored innovram using the 'SAVE CFG' selection above.

Parameter Factory Default settings
Stacker hopper linit **100** notes
Size mode **Auto** size
Denomination table pointer **None** selected
Value mode Value **OFF**
LV2 detectors ON/OFF All detectors **ON**
Speed table pointers **1500**
Speed table settings **1500**, 1200, 1000, 600 (Speeds 1000 & 600 are not available while the smds detector is switched on.)
Batch size table pointer **100**
Batch size table settings **100**, 50, 25, 20, 10, 5
Note that in the following supervisor modes if the settings arechanged, they are NOT stored in NOVRAM unless this supervisormode is used to store them (i.e. 'SAVE CFG').

7.2 Mode 1 – SMDS Detector Mode for Value Operation(€III + machines only)

This function allows the method of value determination to be selectedfrom a menu. The display shows the currently selected mode when itis entered, and the SIZE key is used to step through the menuoptions. The displayed mode is selected when the TOTAL key ispressed to exit the supervisor mode.

If the selected value mode uses the denomination table and an errorcondition exists the display will flash 'tAbLE', i.e. there are conflicts inthe configuration table or the fixed value denomination codepoints to an empty table location. This condition can only be clearedby pressing the START key, and the supervisor mode can then only beexited by selecting an alternative value mode.
Entry into this supervisor mode will be inhibited when the SMDS detectoris turned OFFor the machine is not in VALUE mode.
The size mode options are as follows:

'dEntr' – Denomination entry mode requires the note value to bemanually entered, with auto–start deselected. It then operates in thesame way as auto–size mode determining the value of the first note andusing the results to set acceptance limits for the remaining notes in the bundle.

'FdEn xx' – Fixed denomination mode may be used to count notes of a preset denomination. With this mode selected, two different operating processes are available which depend on whether 'autostart' has been selected or not.

Fden operation With 'autostart' deselected
In this mode the display will show 'FdEn xx' when notes are placed onthe feed hopper, where xx (= 1 to 20) is the current configuration table index.
The denomination value corresponding to the configuration table index may beviewed on the display by pressing and holding the VALUE key and is indicated by a 'd' on the left of the display. Releasing the VALUE key returns the display to the configuration table index. At this point the configuration table index can be changed using the numerical keys and the CLEAR key, or the START key pressed to commence counting using the displayed configuration table pointer. This will be repeated each time the machine has stopped counting and notes are placed on the feed hopper with the autostart de–selected. Autostart may be selected before the START key is pressed to commence counting.

Fden operation With 'autostart' selected
In this mode the machine commences counting as soon as notes areplaced on the feed hopper, using the most recently entered configuration tableindex, or default if none has been entered, and will remain in thismode until autostart is deselected (while the machine is not counting).
If notes are placed in the feed hopper with the current configuration table indexpointing to an empty location, counting will not commence and anerror will not be reported.

'AdEn' – Auto denomination mode determines the value of the first note and then compares the results with the characteristics for each denomination in the configuration table, until it finds a match. The matched denomination characteristics are then used as acceptance limits for the remaining notes in the bundle, and the corresponding note value in the table is then attributed to all the notes counted in the bundle.

'SPECL' – Mixed bundle mode determines the value of each note in a bundle. Mixedbundle mode only operates with €III+ variants. When mixed bundle mode is selected and the supervisor mode exited, operation of the SIZE key will toggle between both long and short edge size detection selected and the size detector OFF.

7.3 Mode 2 – Auto Start Delay Time Adjustment

When this mode is selected a value between "0" and "9" will be displayed. This value represents the delay time in 1/10ths of a second between the notes being presented in the feed hopper and the start of the feed motor. The value may be adjusted using the numeric keys. "9" represents 9/10ths of a second delay. "0" represent no delay. A larger delay may be used for new or inexperienced operators allowing more time to present and adjust the notes before the count commences.

7.4 Modes 4

Supervisor mode 4 has not been allocated.

7.5 Mode 5 –

Supervisor mode 5 has not been allocated.

7.6 Mode 6 – Select Stacker Hopper Limit

When this mode is selected the BATCH display will show '–6–'. TheCOUNT display will show the current stack limit and can be changedwithin the valid range of 50 to 200 by pressing the numeric keys.
To exit the supervisor mode, press the TOTAL key.

7.7 Mode 7

Supervisor modes 7 have not been allocated.

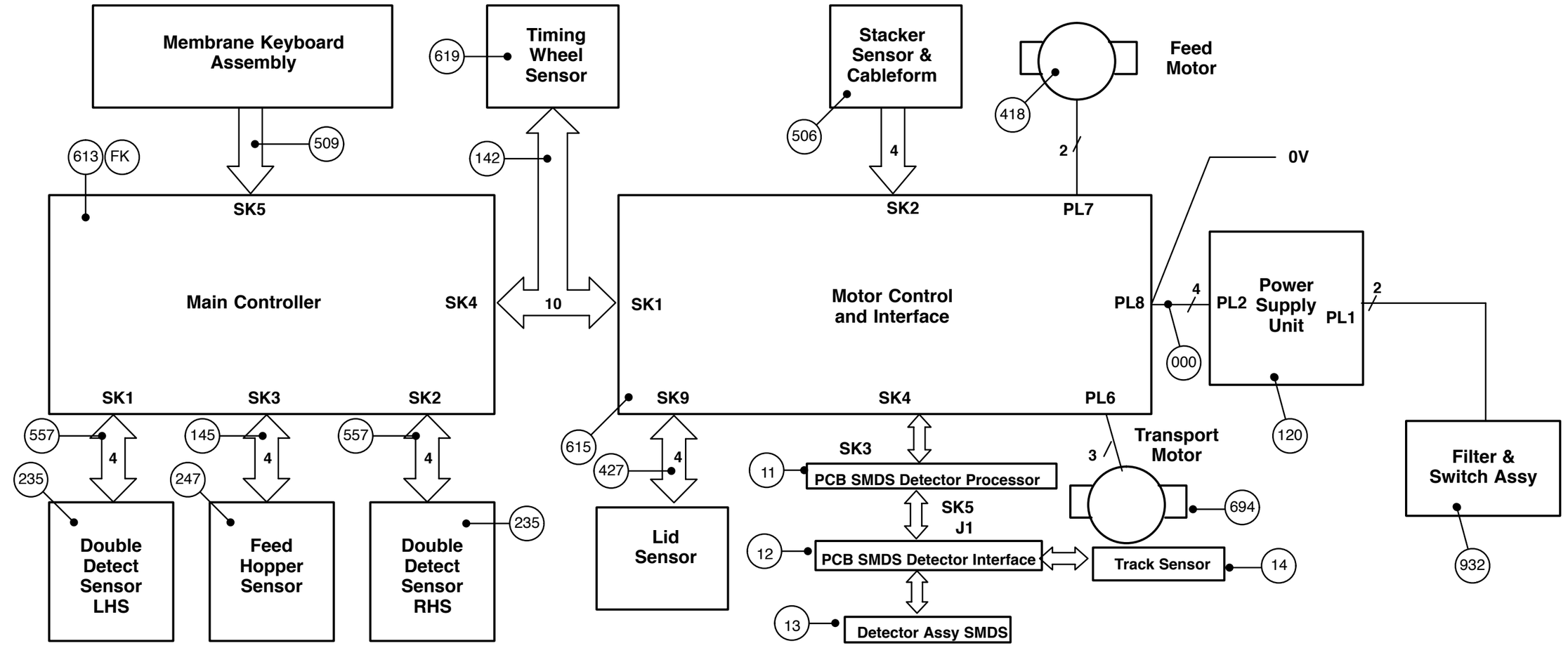
7.8 Mode 8 – SMDS Sensitivity Level

This function allows a sensitivity level between 1 and 4 to be selected from the table below.

	Level 4	Level 3	Level 2	Level 1
	Features	**Features**	**Features**	**Features**
	Denomination match against required security level 4 scores. Min/max activity count. Gross over length check. Excessive stretched algorithm will run only if no normal code structure and pattern match could be found.	Denomination match against required security level 3 scores. Min/max activity count. Length verified against min, max denomination table values.	Denomination match against required security level 2 scores. Min/max activity count. Length verified against min, max denomination table values but note length compensated for skew either by the doubles or from the SMDS feature. Two code structures seen on the note.	Denomination match against required security level 2 scores. Repeated denom code seen. Min/max activity count. Length verified against min, max denimination table values but note length compensated for skew either by the doubles or from the SMDS. Two code structures seen both with high scores.
	Run on poor quality single denomination notes OR on notes that appear to have stretched thread problems.	Normal mode of operation	Used if running high denominations and the user need a very high level of counterfeit out sort.	The ultimate. Only really need on very high denomination notes if one is worried of very good counterfeits.
5		Recommended		
10		Recommended		
20		Recommended		
50		Recommended		
100			Recommended	
200			Recommended	
500			Recommended	

7.9 **Mode 9**

Supervisor mode 9 has not been allocated



ITEM	DESCRIPTION	PART No.
120	PSU	02620415
142	Main Controller Cableform	2606000301
145	Feed Sensor Cableform	2606000601
235	PCBP Double Detect	2609530701
247	Feed Hopper Sensor PCB	2609530801
418	Feed Motor Assy – Buhler B8	2602013201
427	Cableform, Lid Open Sensor	2606004902
506	Cableform Stacker Sensor B9	2606303602
509	2650 Membrane Keyboard – B9	see Figure 2 App3
557	Doubles Detect Cableform	2606006401

ITEM	DESCRIPTION	PART No.
613	PCBP Main Controller B9	2609536503
FK	2650 Euro Range	FK100059/04
615	Motor Control PCB Kit Euro	2604540002
619	Timing Wheel Sensor PCB B8	2609536702
694	Transport Motor Kit	02510186
932	Filter & Switch Assembly	2606303705
11	PCB SMDS Detector Processor	2604312402
12	PCB SMD Detector Interface	
13	Detector Assy SMDS	2602317204
14	PCB Ref Track Sensor	2609535504

ITEM	DESCRIPTION	PART No.
000	Cableform, PSU – A.B. Motor Control	2606006201
	Cordset Euro–Plug	02540414
	Cordset USA–Plug	02540415
	Cordset UK–Plug	02540516
	Cordset Australia/N.Z. – Plug	02540550
	Cordset India/S. Africa – Plug	02540630
	Cordset Israel – Plug	02540902

Figure 1: 2650 €III SMDS Interconnection Diagram

Appendix 5

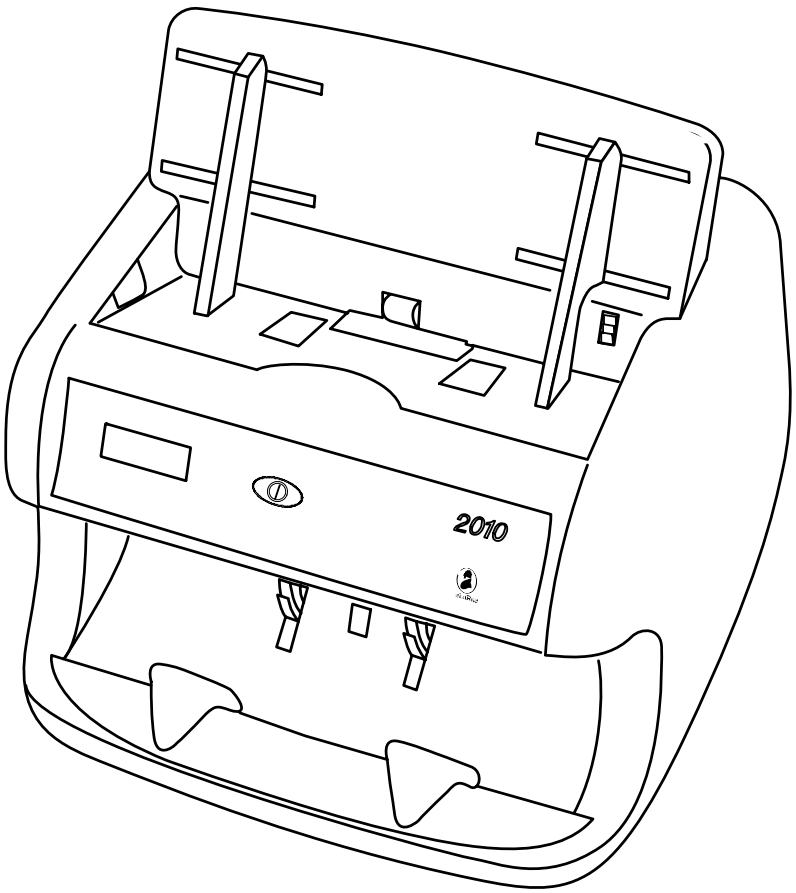
2010 User Guide

DeLaRue

user guide

2010

Currency counting machine



DeLaRue

DE LA RUE
CASH SYSTEMS

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England

Telephone 023 92383161
Fax 023 92325822

Dear Customer,

Thank you for purchasing the new 2010 Note Counter from De La Rue. We are proud to have introduced several enhancements to the product, which bring the following benefits.

- a more open stacker area for even easier access to counted notes
- a new rounded shape giving a modern look in keeping with the new millennium

With over 40 years' experience in the design, development and manufacture of world class banknote counting machines – De La Rue supply more machines worldwide than any other manufacturer.

Quality is paramount in our manufacturing process and we are proud to hold certificates for European quality directives for both safety and electromagnetic standards. In addition to this our manufacturing sites have been awarded ISO 9001 quality certificates.

To ensure maximum life from your machine we recommend that it is regularly serviced. To assist you, we provide world–wide service and support through our network of branch offices and authorised distributors. Please contact them for your nearest service office.

Thank you again for choosing De La Rue

Yours sincerely,

Ian McCormick
Managing Director,
DTP
De La Rue Cash Systems

BS EN ISO 9001
FM 689

De La Rue Cash Systems
a division of
De La Rue International Ltd
Registered Office
De La Rue House, Jays Close,
Viables, Basingstoke,
Hampshire, RG22 4BS.
Registered No. 720284 England

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Setting up 4

Basic operating functions

Batch mode 7

Count mode 8

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Maintenance

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Routine maintenance 11

Declaration of conformity

Manufacturer & responsible person
De La Rue
Walton Road, Farlington,
Portsmouth, Hampshire PO6 1TJ
Telephone: +44 (023) 92383161
Telefax: +44 (023) 92325822

Details of product
Currency counter

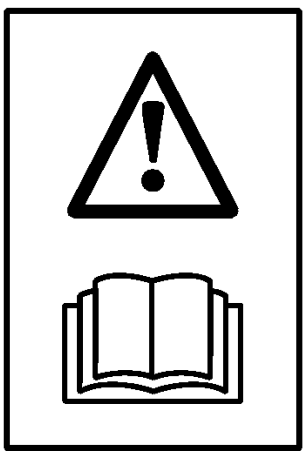
Model types
20XX and 26XX Series
Series Variants

This product conforms to the essential requirements of:

Electromagnetic compatibility	Directive 89/336/EEC Amended by 92/31/EEC
Low voltage electrical equipment (safety)	Directive 73/23/EEC Amended by 93/68/EEC
Machinery Safety	Directive 89/392/EEC Amended by 91/368/EEC,93/44/EEC and 93/68/EEC

and is supported by the following applicable standards

EN 55 022	EN292–1
EN 50 082–1	EN292–2
EN 60 950	pr EN1050
EN 29001 (ISO 9001)	



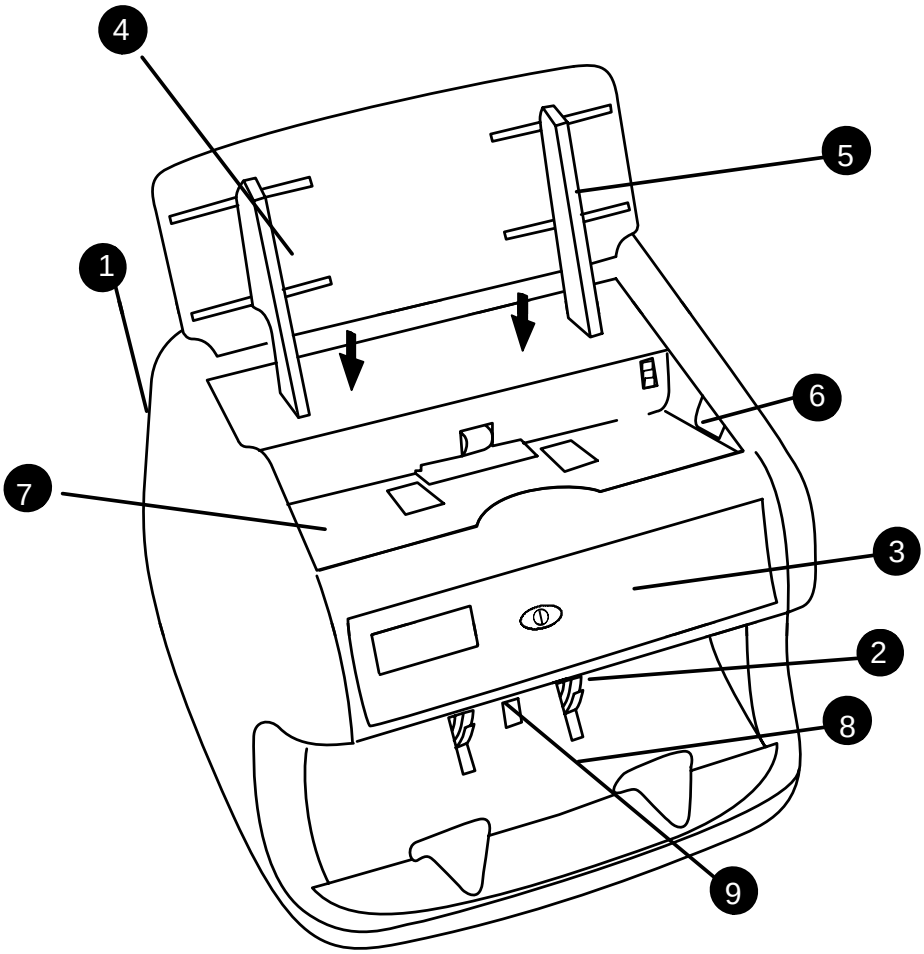
Warning

This machine has been designed for optimum safety for users. For your added protection please follow these guidelines.

Voltages above 42V are potentially dangerous.
Always handle mains–supplied equipment with caution.
Never open the machine when it is plugged in.

If the sensors are obscured the feed rollers will operate.
Always keep loose clothing and hair out of the feed hopper area when operating the machine.

overview of machine

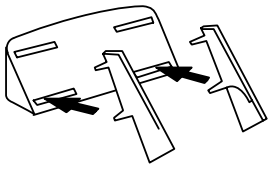


The 2010 model is easy to use providing cost effective accurate note counting.

1	**On / off switch**	
2	**Lifting point**	hold under centre of control panel
3	**Control panel**	single button, 3 digit red LED display
4	**Note guide support**	aligns notes to be counted
5	**Note guides**	
6	**Release buttons**	for service/jam clearance/cleaning access
7	**Hopper**	notes are placed here for counting
8	**Stacker**	counted notes are collected here
9	**Stacker sensor**	for detecting counted notes

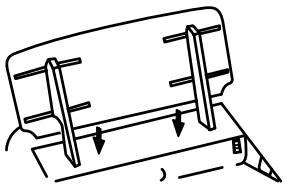
setting up

1



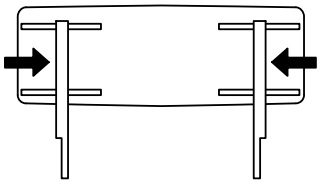
Attach the note guides to the note guide support.

2



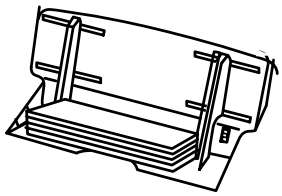
Clip the note guide support to the top of the machine.

3



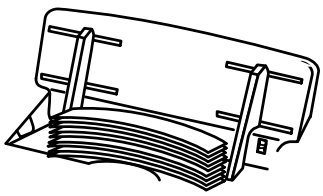
Notes must be positioned centrally, adjust the note guides to the length of the note to be counted allowing adequate clearance for notes to move freely.

4

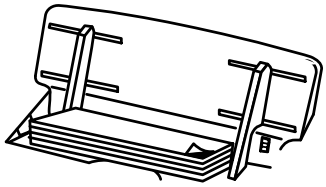


Notes to be counted should be placed in the hopper. They should be laid flat and stacked neatly together.

4a



bowed notes



cornerfolded notes

When counting damaged or deformed notes, the following guidelines should be observed for optimum performance.

Place bowed notes with edges pointing down onto the hopper.

Cornerfolded notes should be sorted with the folds in the bottom right hand corner and the bundle placed face down onto the hopper.

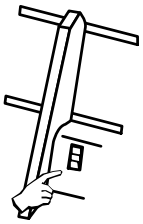
Setting up

Achieving optimum performance

To achieve optimum performance for your application, it is necessary to set up the note counter prior to use.

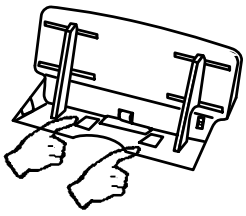
The machine must be switched OFF prior to setting.

1



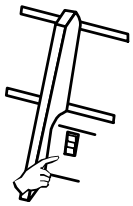
Open the feedgap control by turning it upwards to the smallest setting.

2



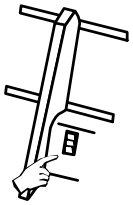
Turn the rubber rollers until the ridged portion is uppermost.

3



Adjust the feedgap control downwards one click at a time, until some resistance is felt when the ridged portion of the rubber roller is moved gently backwards and forwards by hand.

4



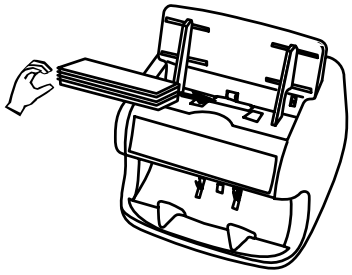
Now adjust the feedgap control upwards two clicks (or one whole position on the indicator).

Setting up

5

The counter is now ready to be used.
Switch the machine on.

6



Place a pack of notes on the hopper.
The machine will start to count.

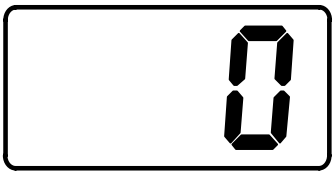
If the machine hesitates when feeding notes or shows any other problems, adjust the feedgap to one click either side of the chosen position.

The note counter is now set to achieve optimum count performance.

switching on

Connect the mains lead to the socket on the rear panel of the machine.

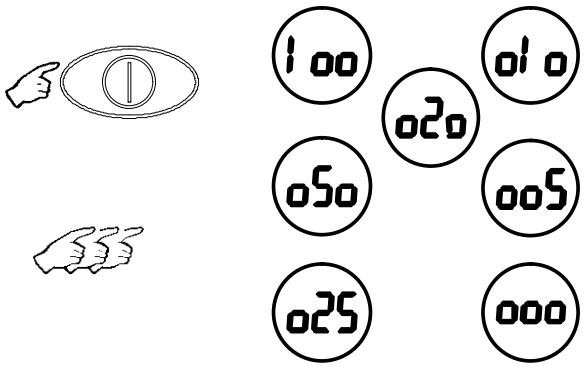
Plug the machine‘s power lead into a mains socket and switch on the mains supply.
Switch on the machine‘s on/off switch.



The machine will power up and complete a self test routine.
The display will select a batch size of 100 notes and the autostart function will be activated.

batch mode

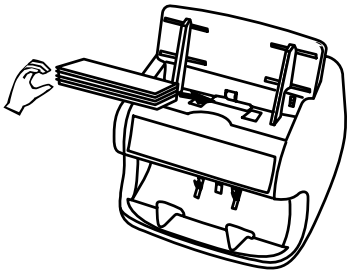
1



When the machine is switched ON it will show a ’0’ .
Press the KEY and it will show the default batch size of 100. Use the key to step through the preset batch sizes e.g. 1oo, o5o, o25, o2o, o1o, oo5 and ooo (which is the continuous count mode).

Select the batch size required, release the KEY for 1–2 seconds and the display will show ’0’ and will be ready to count using the chosen batch size.

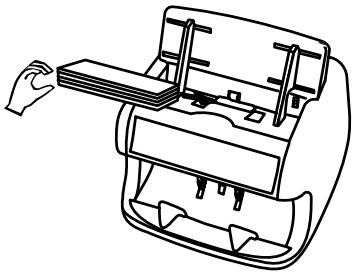
2



Place the notes to be counted onto the feed hopper. The machine will always auto start when notes are placed onto the feed hopper, unless Auto disabled.

The machine will stop when the chosen batch size has been counted. Remove the notes from the stacker, the machine will count the next batch.

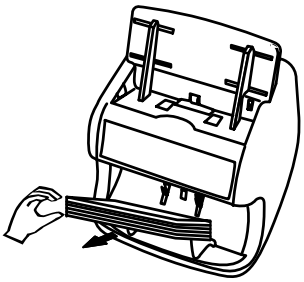
3

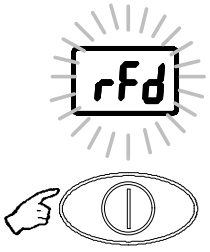


If there are not enough notes in the feed hopper to complete a batch, the total counted will flash on the count display to indicate this. Without removing the notes in the stacker, add more notes to the feed hopper and the machine will continue to count.

If the stacker is emptied before a batch is complete, the batch count will be cancelled when the feed hopper is loaded. The count will revert to ’0’.

4

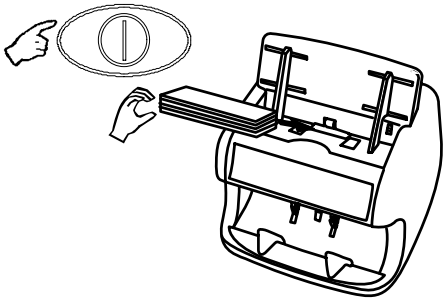




If the machine feeds a ’degraded note’, it will show a ’rFd’ or ‘Chc’ error message. Remove the notes from the stacker and return the notes to the feed hopper after checking them for damaged notes, if a ‘Chc’ message was displayed. Press the KEY to repeat the count. The display will revert to ’0’ to recommence the count.

count mode

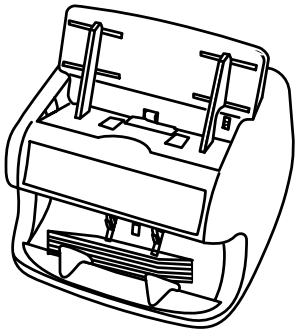
1

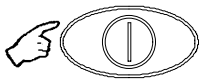


To choose continuous count mode, press the KEY until 'ooo' is displayed. Release the key for 1–2 seconds and the display will show '0'.

Place the notes to be counted onto the feed hopper. The machine will start to count automatically, unless Auto disabled.

2



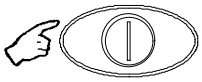


If the KEY is pressed during counting, the machine will stop. Press the KEY to restart the count.

The machine will count until the feed hopper is empty. The display will flash. When more notes are added, they will be added onto the running total. The machine will also stop when the stacker is full. Remove the notes from the stacker to continue the count.

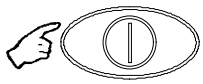
Press the KEY once to zero the count total.

3



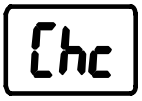
The maximum number of notes that can be counted in continuous count mode is '999'. After the next note, the machine will show '0.0.0.' and flash. Press the KEY to clear the total and the count display will begin again at '0'.

4



If the machine feeds a 'degraded note', it will show a 'rFd' or 'Chc' error message. Remove the notes from the stacker and return the notes to the feed hopper after checking them for damaged notes, if a 'Chc' message was displayed. Press the KEY to repeat the count. The display will revert to the running total prior to the bundle which caused the error.

display messages

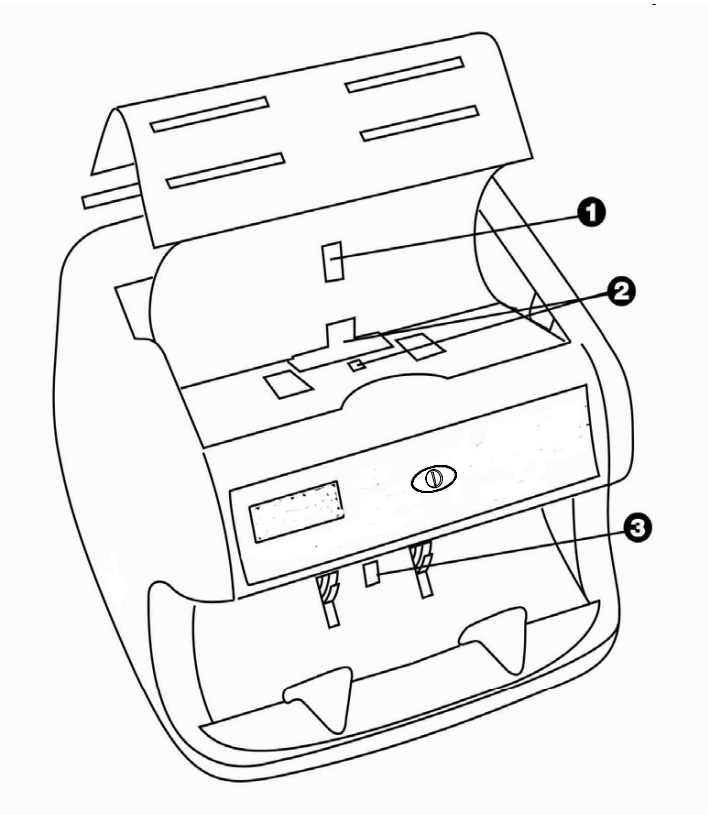
display	reason	solution
	The machine has stopped as a result of a badly damaged or degraded note.	Remove all of the notes from the stacker. Remove any notes with damage, tape or staples. Press the KEY and put notes onto the feed hopper to repeat the count.
	The machine has stopped as a result of a note handling problem.	Remove all the notes from the stacker. Press the KEY and put the notes onto the feed hopper to repeat the count.
	One of the sensors is obscured by dirt.	Clean the sensors in the hopper, stacker and the track sensors. Press the KEY.
	A note has been left in the machine.	Clear the feed hopper, stacker or note track of any notes. Press the KEY.
	Notes are jammed in the note transport.	Switch off the machine. Open the machine by pressing the release buttons. Remove the notes carefully. Close the machine lid. Switch the machine on.
	The top lid is not closed.	Press on both sides of the lid and ensure an audible click is heard. The lid is now closed. Press the KEY.
	A half or folded note has been detected in the machine.	Remove all notes from the stacker. Remove all half notes or unfold folded notes. Press the KEY and put notes onto the feed hopper to repeat the count.
	3 or more notes have passed through the machine together.	Remove all notes from the stacker. Press the KEY. Put the notes onto the feed hopper to repeat the count.
	A fault has been detected in the machine	Switch off the machine and contact your agent's service engineer.

factory settings / specifications

Mains voltage	nominally 110 to 240 VAC, 50/60 Hz
Power consumption	150W max.
Acoustic noise level	<78 dBA
Dimensions	
Width	300mm
Depth	260mm
Height	190mm
Weight	6kg
Document size range	190mm x 90mm maximum 100mm x 50mm minimum
Throughput rate	1000 notes per minute
Stacker capacity	100 notes
Feed hopper capacity	500 notes
LED display	3 digits
Batch size settings	100, 50, 25, 20, 10, 5
Batch size default	100 notes

specifications

routine maintenance



The various sensors in the machine may fail if they are obscured by dirt.

Switch the machine off, and open the lid.

Using a dry cloth, clean the hopper, stacker and track sensors and prism (1, 2 and 3).

Appendix 6

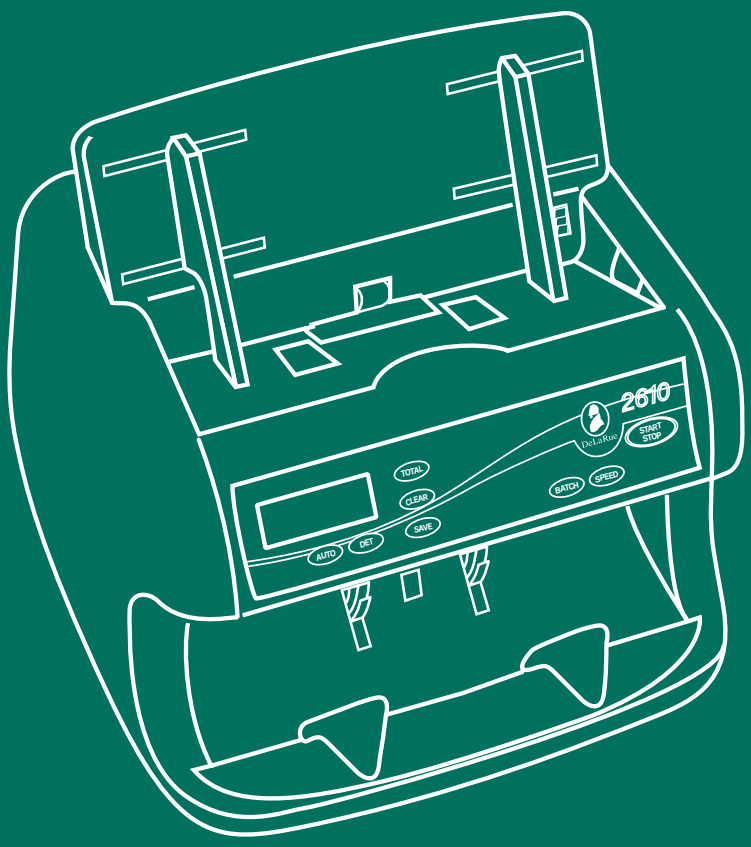
2610/2650 User Guide

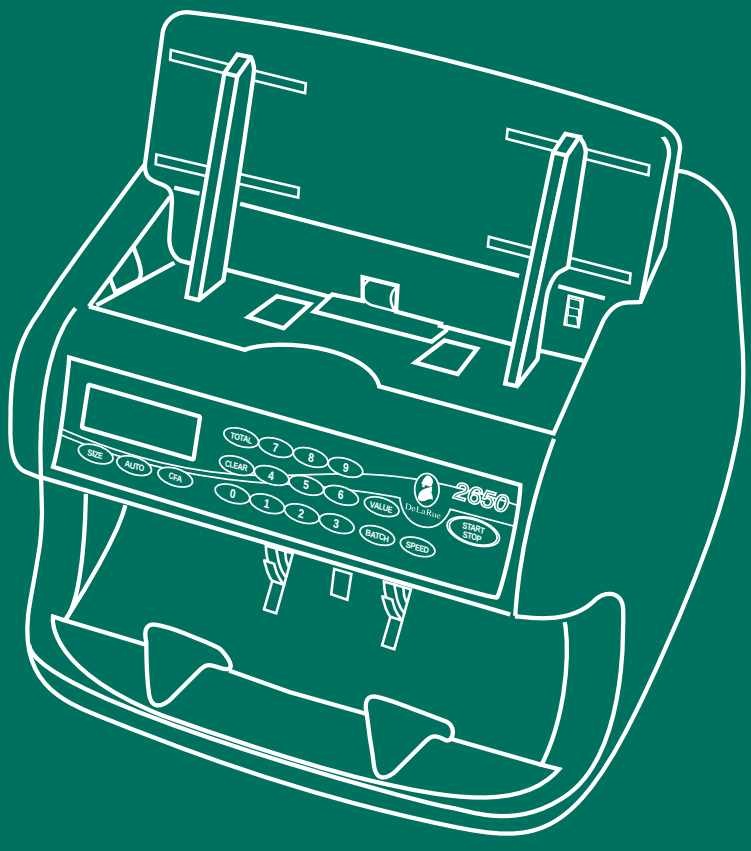
DeLaRue

user guide

2610/2650

Currency counting machines





DE LA RUE
CASH SYSTEMS

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P06 1TJ
England

Telephone: +44 (023) 92 383161
Fax: +44 (023) 92 325822

Dear Customer,

Thank you for purchasing the new 2600 Series note counter from De La Rue. We are proud to have introduced several enhancements to the product, which bring the following benefits:

- a more open stacker area for even easier access to counted notes
- new detector suite for optimum authentication of the euro notes
- a new rounded shape giving a modern look in keeping with the new millennium

With over 40 years' experience in the design, development and manufacture of world class banknote counting machines – De La Rue supply more machines worldwide than any other manufacturer.

Quality is paramount in our manufacturing process and we are proud to hold certificates for European quality directives for both safety and electromagnetic standards. In addition to this our manufacturing sites have been awarded ISO 9002 quality certificates.

To ensure maximum life from your machine we recommend that it is regularly serviced. To assist you, we provide worldwide service and support through our network of branch offices and authorised distributors. Please contact them for the location of your nearest service office.

Thank you again for choosing De La Rue.

Yours sincerely,

Ian McCormick
Managing Director
DTP
De La Rue Cash Systems

BS EN ISO 9001
FM 689

De La Rue
Cash Systems
a division of
De La Rue International Ltd
Registered Office
De La Rue House
Jays Close, Viables,
Basingstoke, RG22 4BS
Registered No. 720284 England

De La Rue Cash Systems is pleased to give detailed specifications of its products in this leaflet but expressly reserves the right to vary these at at its discretion at any time without notice. As the Company's products and services are continuously being developed it is important for customers to check that the information contained herein includes the latest particulars. This leaflet is for general guidance only and may contain inappropriate information under particular conditions of use. All recommendations and suggestions issued by or on behalf of the Company in whatever form, are subject to the Company's terms and conditions of sale, of which a copy will be supplied on request. This document is not part of a contract or licence, save insofar as may be expressly agreed.

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CE

Declaration of conformity

Manufacturer & responsible person
De La Rue
Walton Road, Farlington,
Portsmouth, Hampshire PO6 1TJ
Telephone: +44 (0) 23 9238 3161
Telefax: +44 (0) 23 9232 5822

Details of product
Currency counter

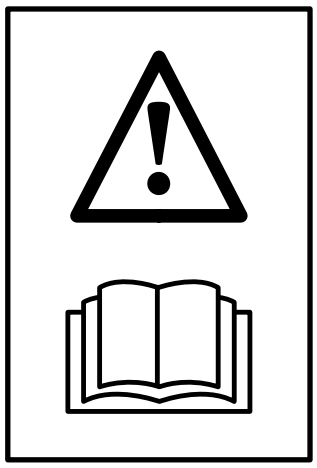
Model types
20XX and 26XX
Series Variants

This product conforms to the essential requirements of:

Electromagnetic compatibility	Directive 89/336/EEC Amended by 92/31/EEC
Low voltage electrical equipment (safety)	Directive 73/23/EEC Amended by 93/68/EEC
Machinery Safety	Directive 89/392/EEC Amended by 91/368/EEC, 93/44/EEC and 93/68/EEC

and is supported by the following applicable standards

EN 55 022	EN292-1
EN 50 082-1	EN292-2
EN 60 950	pr EN1050
EN 29001 (ISO 9001)	



Warning

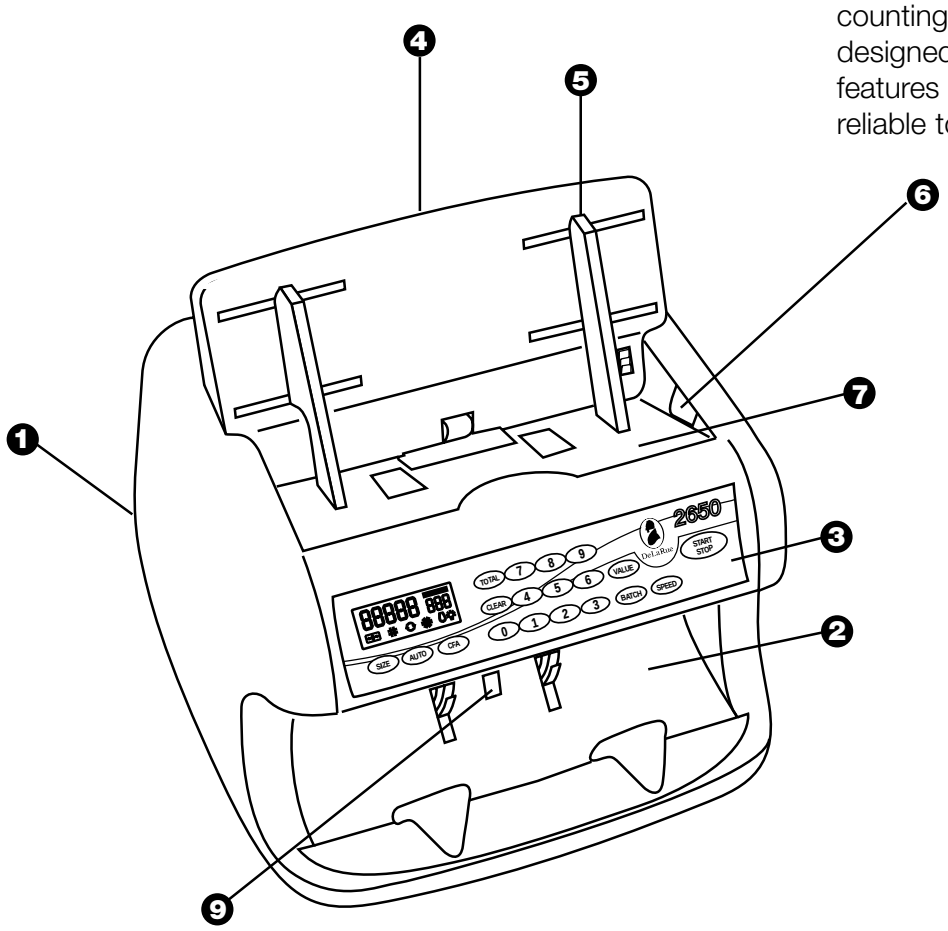
This machine has been designed for optimum safety for users. For your added protection please follow these guidelines.

Voltages above 42V are potentially dangerous.
Always handle mains-supplied equipment with caution.
Never open the machine when it is plugged in.

If the sensors are obscured the feed rollers will operate.
Always keep loose clothing and hair out of the feed hopper area when operating the machine.

overview of machine

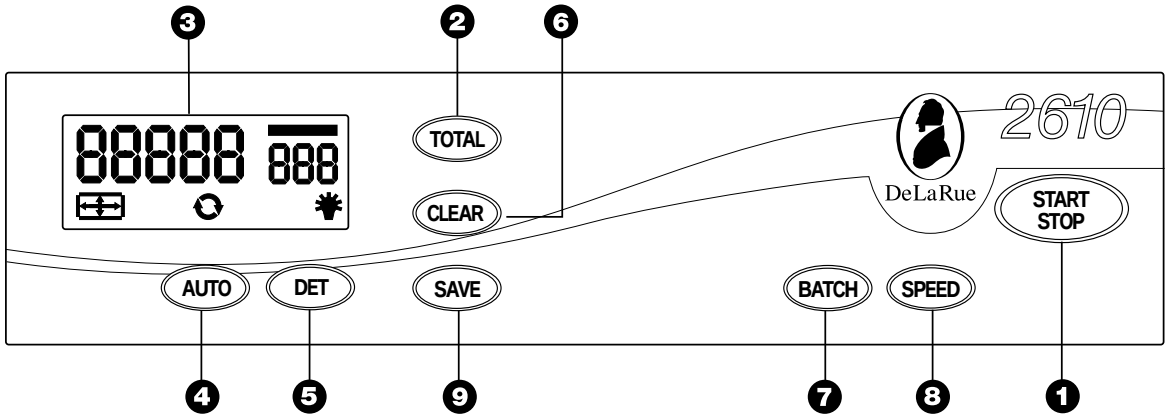
The 2610 and 2650 are accurate, high speed, automatic currency counting machines. They have been designed to incorporate many useful features and to be easy, safe and reliable to use and maintain.



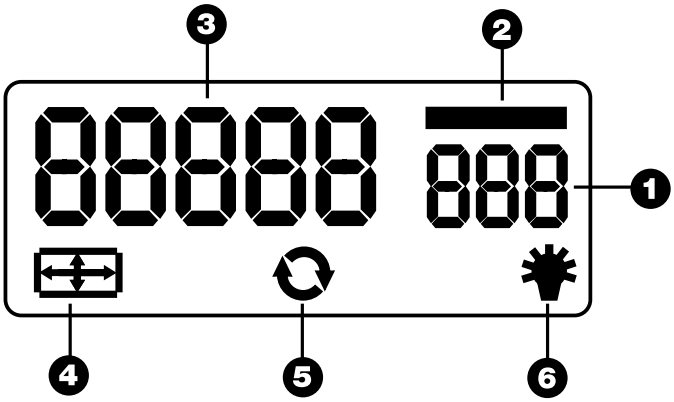
1	**On/off switch**	
2	**Lifting point**	hold under centre of control panel
3	**Control panel**	(different on 2610 machines)
4	**Note guide support**	} aligns notes to be counted
5	**Note guides**	
6	**Release buttons**	for service/jam clearance/cleaning access
7	**Hopper**	notes are placed here for counting
8	**Stacker**	counted notes are collected here
9	**Stacker sensor**	for detecting counted notes

2610 controls

***** The functions of these keys and corresponding symbols are dependent upon the feature being fitted.



1	**Start/stop**	
2	**Total**	displays total of notes counted
3	**Display**	
4	**Auto**	enables/disables automatic start
***5**	**Det**	enables either size or UV detection
6	**Clear**	clears display
7	**Batch**	set batch size, press to step through pre-set batch sizes
8	**Speed**	set throughput speed, press to step through pre-set speeds
9	**Save**	save new batch sizes to memory

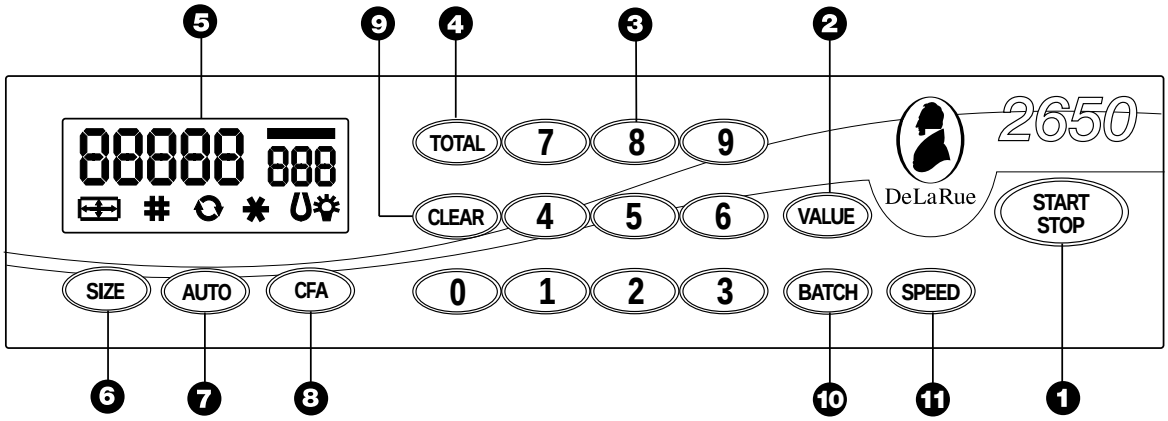


1	**Batch display**	displays the batch quantity (000 for count mode)
2	**Bar**	always visible, 2610 operates in count/batch mode
3	**Count display**	displays the count
***4**	**Size**	visible if size detection is on
5	**Autostart**	visible if autostart is on
***6**	**UV detection**	visible if UV detection is on

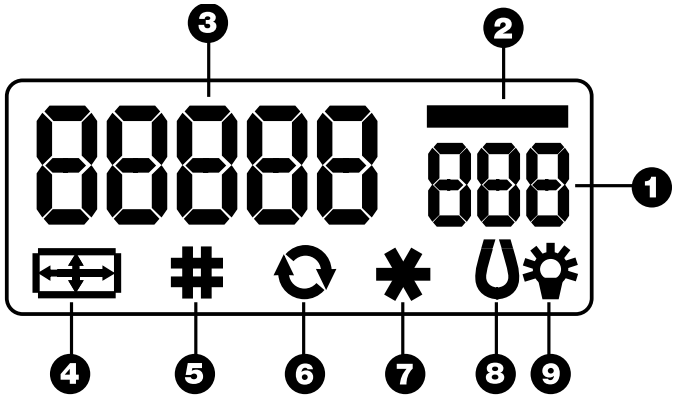
Note: 2610 machines can be fitted with either size detection or UV detection, but not both.

2650 controls

***** The functions of these keys and corresponding symbols are dependent upon the feature being fitted.



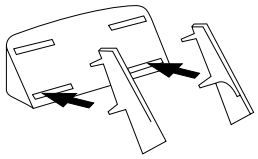
1	**Start/stop**	
2	**Value**	press to select batch/count, value count or value dispense mode
3	**Numeric keypad**	
4	**Total**	displays total of notes counted
5	**Display**	
***6**	**Size**	enables/disables note size detection
7	**Auto**	enables/disables automatic start
***8**	**CFA**	enables/disables detection of counterfeit notes
9	**Clear**	clears display
10	**Batch**	set batch size, press to step through pre-set batch sizes
11	**Speed**	set throughput speed, press to step through pre-set speeds



1	**Batch display**	displays the batch quantity (000 for count mode)
2	**Bar**	visible in count & batch mode, invisible in value mode
3	**Count display**	displays the count
***4**	**Size**	visible if size detection is on
***5**	**CMS**	visible if machine is on-line to PC
6	**Autostart**	visible if autostart is on
***7**	**Infra red**	visible if infra red detector is on
***8**	**Magnetics detection**	visible if magnetics detection is on
***9**	**UV detection**	visible if UV detection is on

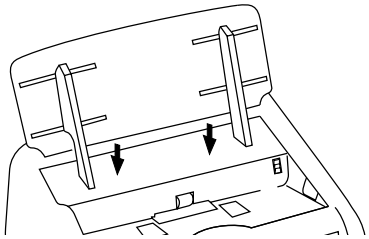
setting up

1



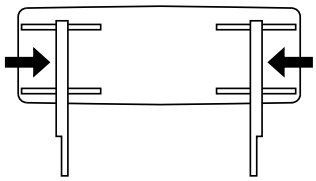
Attach the note guides to the note guide support.

2



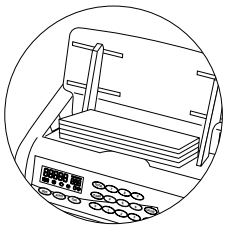
Clip the note guide support to the top of the machine.

3



Notes must be positioned centrally, adjust the note guides to the length of the notes to be counted allowing adequate clearance for notes to move freely.

4



Notes to be counted should be placed in the hopper. They should be laid flat and stacked neatly together.

4a

bowed notes

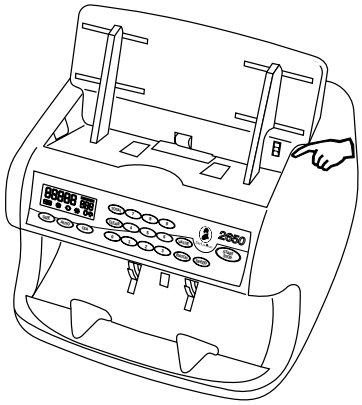
cornerfolded notes

When counting damaged or deformed notes, the following guidelines should be observed for optimum performance.

Place bowed notes with edges pointing down onto hopper.

Cornerfolded notes should be sorted with the folds in the bottom right hand corner and the bundle placed face down onto the hopper.

5



Depending on the thickness and quality of notes being counted, you can adjust the feedgap where the notes enter the machine.
The control has ten positions.
Turn off the mains switch, open the top of the machine by releasing the blue buttons together as shown.

setting up

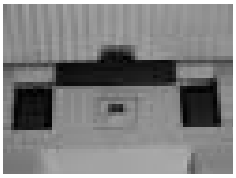
achieving optimum performance

1

The machine must be switched OFF prior to setting.

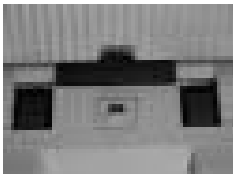
Open the feedgap control by turning it upwards to the smallest setting.

2



Turn the rubber rollers until the ridged portion is uppermost.

3

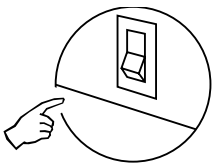


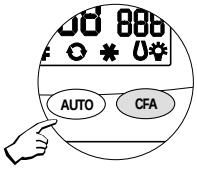
Adjust the feedgap control downwards one click at a time, until some resistance is felt when the ridged portion of the rubber roller is moved gently backwards and forwards by hand.

4

Now adjust the feedgap control upwards two clicks (or one whole position on the indicator).

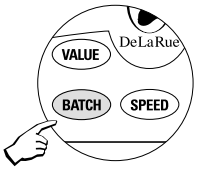
5

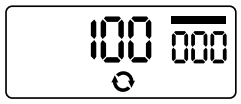




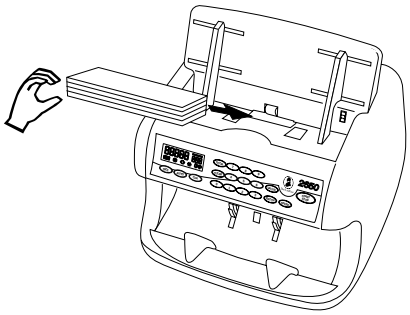
The counter is now ready to be used. Switch the machine on. Turn off any detectors which might be fitted by pressing **CFA**, Auto and/or **SIZE/DEN** keys.

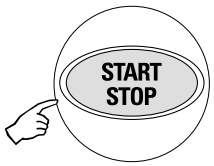
6





Set the batch size to 100 by pressing the **BATCH** key until 100 appears on the display. Place a pack of notes on the hopper and press START. The machine will start to count.



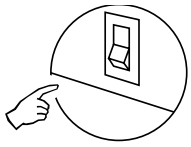


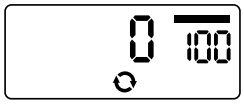
If the machine hesitates when feeding notes or shows any other problems, adjust the feedgap to one click either side of the chosen position.

The counter is now set to achieve optimum count performance.

setting up

switching on





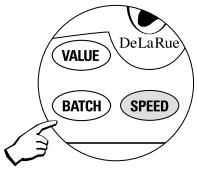
Connect the mains lead to the socket on the rear panel of the machine.

Plug the machine's power lead into a mains socket and switch on the mains supply.

Switch on the machine's on/off switch.

The machine will power up and complete a self test routine.
The display will select a batch size of 100 notes and the autostart function will be activated.

speed



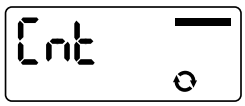
You may want to reduce the speed, for example, when counting very poor quality notes.

Select the throughput speed by pressing the **SPEED** key.

Press this key repeatedly to step through the speeds that have been preset e.g. 1500, 1200, 1000, 600.

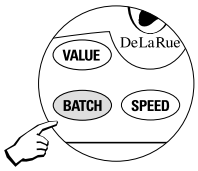
Note: 2610 machines have pre-set speeds of 1200, 1000, 600 only.

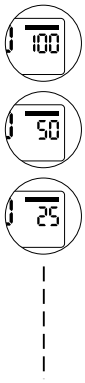
batch mode



The 2610 machine has only batch/count mode. The 2650 is in batch/count mode if the display shows Cnt when the value key is pressed.

1

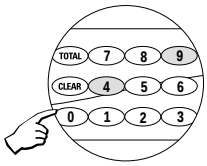


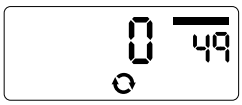


Select the batch size to be counted by pressing the **BATCH** key.

Use this key to step through the quantities that have been pre-set e.g. 100, 50, 25, 20, 10, 5 (and 000 which is the count mode).

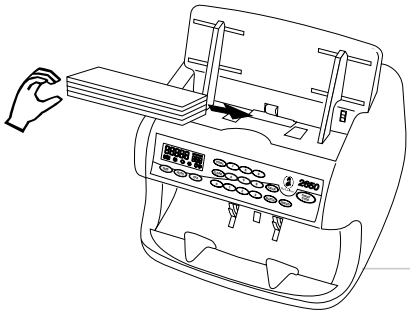
or



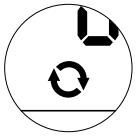


On 2610 the batch size can be changed (see page 35). On the 2650 batch size can be set from 1 to 999 using the keypad.

2

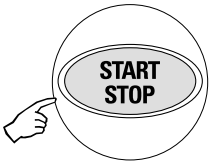


Place the notes to be counted onto the feed hopper.

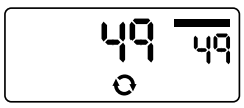


or

The machine will automatically start, with **AUTO** selected, or



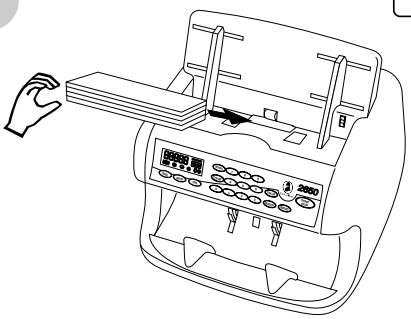
you can choose to start it manually by pressing the **START** key, if auto is deselected.



The machine will stop when the batch size has been reached.

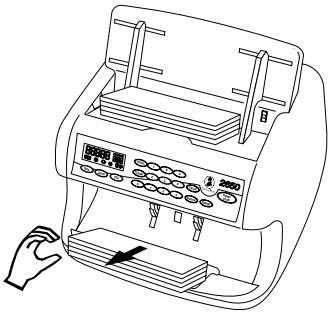
batch mode

3



If there are not enough notes in the feed hopper to complete a batch, the total counted will flash on the count display to indicate this. Without removing the notes in the stacker, add more notes to the feed hopper and the machine will continue to count.

4



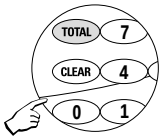
Remove the notes from the stacker.

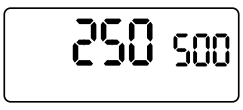
If the machine stops because of a 'degraded note' a rFEEd or ChEC message will be displayed, rFEEd indicates that the whole bundle should be fed again. If ChEC is displayed remove notes from the stacker and return only undamaged notes to the feeder.
If **AUTO** is selected, press **START** to clear the error message, the machine will restart automatically.
If **AUTO** is not selected, press **START** to clear the error message and press **START** to continue the count.

The next batch will be started automatically if there are notes in the feed hopper and autostart is selected.

totals

1

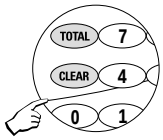


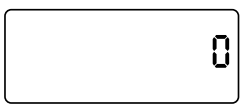


Every time a batch is completed correctly, it is added to a running total.

To show the total number of notes counted in complete batches, press the **TOTAL** key.

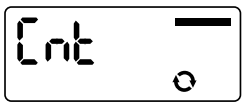
2





To clear the running total, hold down the **TOTAL** key and press **CLEAR**.

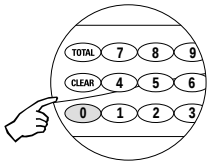
count mode

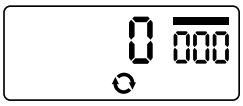


The 2610 has only batch/count mode. The 2650 is in batch/count mode if the display shows Cnt when the value key is pressed.

The machine will count notes continuously, pausing only when the stacker is full.

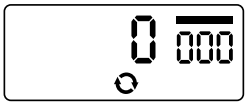
1





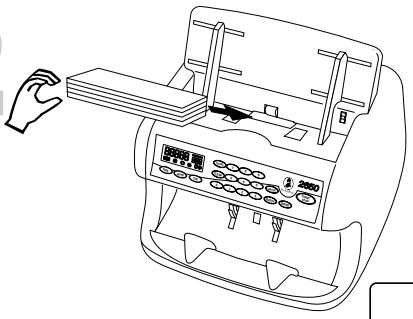
Set the batch size to **000** using the numeric keypad. The display will change to 000

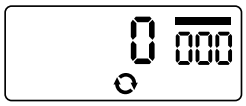
or



Select count mode by pressing the **BATCH** key to step through the pre-set quantities until you reach 000

2

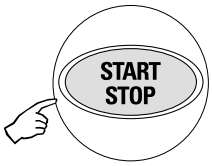




Place the notes to be counted onto the feed hopper.

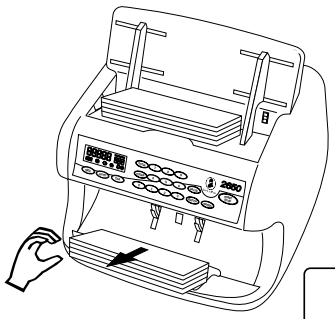
The machine will automatically start, if **AUTO** is selected, or

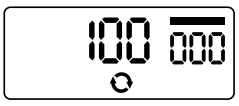
or



you can choose to start it manually by pressing the **START** key.

3



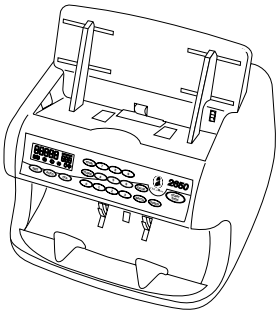


If the stacker limit is set at 100.

If the number of notes to be counted is larger than the stacker limit, remove the notes from the stacker to continue to count.
The machine will restart automatically if **AUTO** is selected.

count mode

4

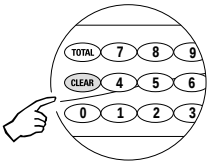


Every time a bundle is completed correctly, it is added to a running total which flashes automatically on the display.

5

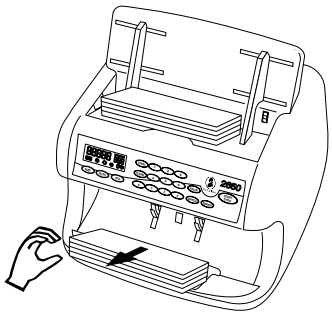
Remove the notes from the stacker.

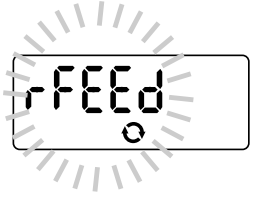
6



To clear the running total press the **CLEAR** key.

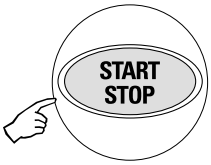
The **maximum** number of notes that can be counted is 99999. When this number is reached the machine will stop and flash 99999. Remove the notes from the stacker and press **CLEAR** to reset the total to 0.





Remove the notes from the stacker.

If the machine stops because of a 'degraded note' a rFEEd or ChEC message will be displayed. rFEEd indicates that the whole bundle should be fed again. If ChEC is displayed remove notes from the stacker and return only undamaged notes to the feeder.
If **AUTO** is selected, press **START** to clear the error message, the machine will restart automatically.
If **AUTO** is not selected, press **START** to clear the error message and press **START** to continue the count.

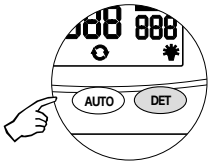


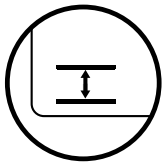
The count will be ignored and the display will revert to zero or the running **TOTAL**.

2610 size & counterfeit

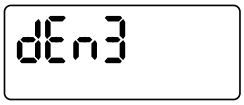
2610 machines can have size OR counterfeit detection

size detection





height selected

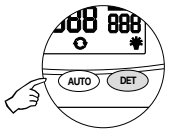


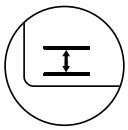
This feature will recognise notes of a different size within a pack. The first note of each pack is used as the reference size. For optimum performance notes should be undamaged.

SD detection
Notes are recognised by their height or short edge dimension. Press **DET** button to enable this function.

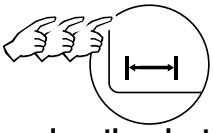
If during operation you see this message displayed, different size note(s) have been identified in the first 3 notes down in the stack of notes.

Examine the notes press **START** to continue count or remove notes from the stacker and press **START** to recommence count.

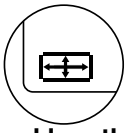




height selected



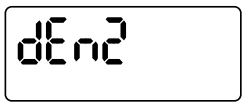
length selected



height and length selected

3D and + detection
This will detect size differences in the height and/or length of notes.

Press **SIZE** button to step through the different options.

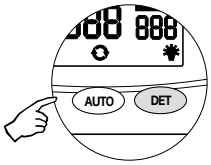


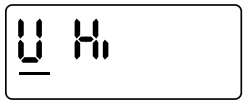
If during operation you see this message displayed, different size note(s) have been identified in the first two notes down in the stack of notes.

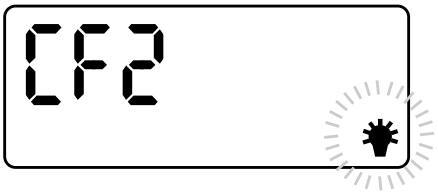
Examine suspect notes. Either return the note to the stacker or replace with the correct size notes as required. Press **START** to continue the count, or remove all notes from the stacker, returning them to the feeder and press **START** to recommence the count from zero.

2610 counterfeit

counterfeit detection







This feature will detect suspect counterfeits. For optimum performance, notes should be undamaged.

UV detection
Press **DET** button to enable this function. Press **DET** to choose between UV Off, UV low sensitivity (gross UV detection) and UV high (fine UV detection).

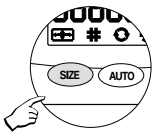
If during operation you see this message displayed, suspect note(s) have been identified as the 1st or 2nd note down in the stack of notes.

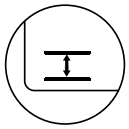
Examine the notes. Press **START** to continue count or remove all notes from the stacker and press **START** to recommence count.

2650 size

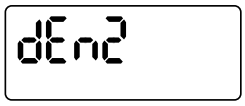
This page is only applicable for machines with advanced functions.

size detection





height selected



This feature will recognise notes of a different size within a pack. The first note of each pack is used as the reference size. For optimum performance notes should be undamaged.

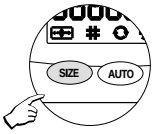
Notes are recognised by their height or short edge dimensions and length or long edge dimensions.

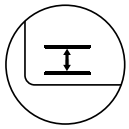
SD option

This will detect size differences in the **height** of notes. Press **SIZE** button to enable this function.

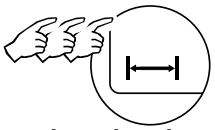
If during operation you see this message displayed, different size note(s) have been identified in the first two notes down in the stack of notes.

Examine suspect notes. Either return the note to the stacker or replace with correct size notes as required. Press **START** to continue the count, or remove all notes from the stacker, returning them to the feeder and press **START** to recommence the count from zero.

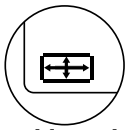




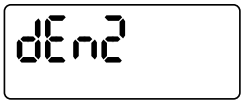
height selected



length selected



height and length selected



3D and + option

€III+ operates on euro notes only.

This will detect size differences in the height and/or length of notes.
Press **SIZE** button to step through the different options.

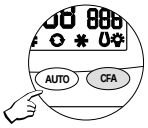
If during operation you see this message displayed, different size note(s) have been identified in the first two notes down in the stack of notes.

Examine suspect notes. Either return the note to the stacker or replace with the correct size notes as required. Press **START** to continue the count, or remove all notes from the stacker, returning them to the feeder and press **START** to recommence the count from zero.

2650 counterfeit

This page is only applicable for machines with UV or EMG Function.

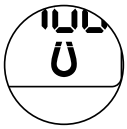
counterfeit detection



EMG and UV option selected

This feature will help detect suspect counterfeits. For optimum performance, notes should be undamaged.

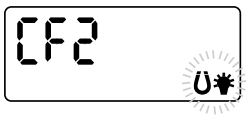
Press the **CFA** key repeatedly to step through the options fitted.



EMG option
This will detect the presence of magnetic qualities of notes.

Machine speed defaults to 1500 notes per minute.

UV option
This will detect differences in the UV brightness of notes.



If during operation you see this message displayed, suspect note(s) have been identified in the first two notes down in the stack of notes. This will cause the relevant symbol to flash (i.e. EMG and/ or UV).

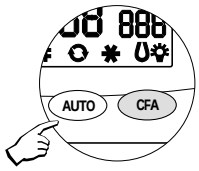
Examine suspect note indicated. Either return notes to the stacker or replace with valid notes as required. Press **START** to continue the count, or remove all notes from the stacker, returning them to the feeder and press **START** to recommence the count from zero.

If size detection is present, a CF stop could be a combination of a different size note and a suspect note.

2650 euro counterfeit

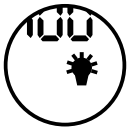
This page is applicable to machines fitted with detectors I, II and III

counterfeit detection

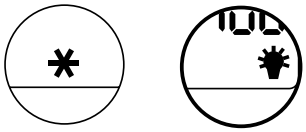


This feature will help detect suspect euro counterfeits. For optimum performance, notes should be undamaged.

Press the **CFA** key repeatedly to step through the options fitted.



I option
This will detect differences in the UV brightness of notes



II option
This will detect differences in the UV brightness of notes and check the IR characteristics on the note. The UV and IR detectors can be selected to work together or separately.

III option
This will check the magnetic properties of the euro notes.

If during operation you see this message displayed, suspect note(s) have been identified in the first two notes down in the stack of notes. This will cause the relevant detector symbol to flash.

Examine the suspect note indicated. Either return notes to the stacker or replace with valid notes as required. Press **START** to continue the count, or remove all notes from the stacker, returning them to the feeder and press **START** to recommence the count from zero.

2610

The following list shows the factory settings of the machine configuration, to which the machine is set at power up.

Stacker hopper limit	100 notes
Size mode	Automatic (if available)
UV detection	On (if available)
UV detection level	Low sensitivity
Speed table default	1200 notes per minute
Speed table settings	1200, 1000, 600
Batch size table default	100
Batch size table settings	100, 50, 25, 20, 10, 5

2650

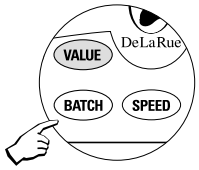
The following list shows the factory settings of the machine configuration, to which the machine is set at power up.

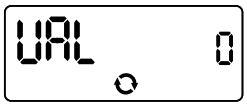
Stacker hopper limit	100 notes
Size mode	Automatic
Denomination table selection	None selected
Size detection mode	Full size detection (height & length)
Size detection level	Longer of two sides
Value mode	Value off
Counterfeit detectors (UV, EMG, I, II, III) & Size detectors	All detectors on
UV detector threshold	UV level 5
Speed table default	1500 notes per minute
Speed table settings	1500, 1200, 1000, 600
Batch size table default	100
Batch size table settings	100, 50, 25, 20, 10, 5
Connectivity setting	9600 baud (CMS only)
Connectivity I, II, III only	9600 baud 7 data bits, even parity 1 stop

2650 value mode

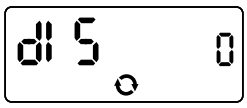
The value and dispense mode of operation are available on all models.

The value function of the machine allows you to 'Value' a bundle of notes by denomination, rather than to count the 'Quantity'. It will also dispense notes by denomination.





Pressing the **VALUE** key twice will switch the machine from counting mode to value count mode.



Pressing the **VALUE** key again will switch the machine to value dispense mode.

value without size

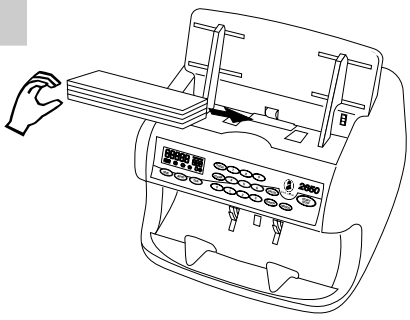
dEntr

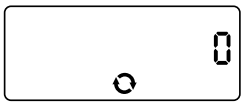
count

1 Denomination entry

The denomination of the notes is manually entered by the operator. The machine will multiply all notes by the value entered.

1

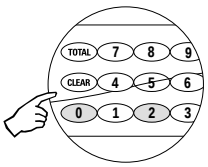


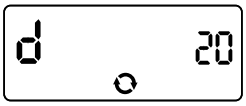


Place notes to be value counted in the hopper.

The denomination value of the last batch of notes will be shown.

2





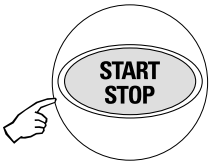
Key in the denomination of the notes to be counted.

NB If a note of a different denomination is hidden in a bundle it will be valued as the denomination selected.

2650 value mode

value without size

3

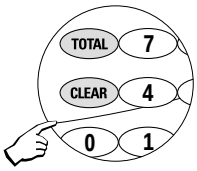


Press the **START** key.

With **AUTO** selected the machine will continue to count each bundle at the denomination set, adding the value of each batch to a running total.

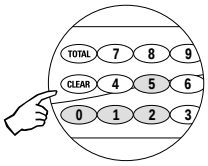
If **AUTO** is not selected the denomination may be changed for each new batch. The display will show the total value counted.

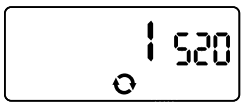
To clear the running total and to start to count a new denomination press **TOTAL** and **CLEAR** together.



dispense

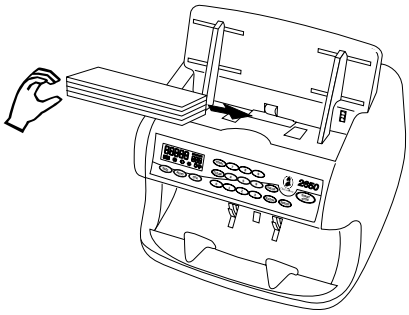
1





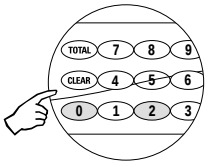
Key in the value to be dispensed.

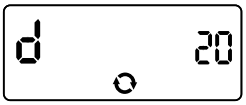
2



Place notes to be dispensed in the hopper.

3





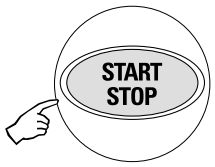
Key in the denomination of the notes to be dispensed.

2650 value mode

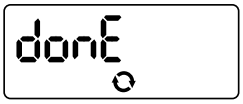
value without size

dispense...

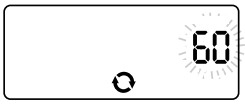
4



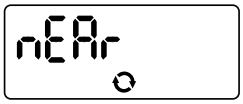
Press the **START** key.



If the dispense amount has been completed successfully the display will show **DONE**.

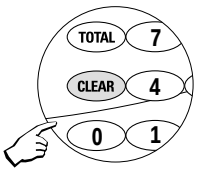


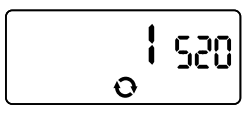
If the dispense amount cannot be completed successfully because there are not enough notes on the hopper the display will flash the remaining value it needs.



If the dispense amount cannot be completed successfully because the denomination set is larger than the remaining value required, the display will show **NEAR**.

Place a new denomination in the hopper, press **START**, and input the new denomination to complete the dispense.

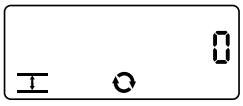




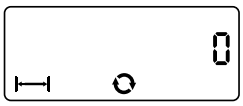
Remove the notes or press **CLEAR** to revert back to the dispense amount.

2650 value mode

value with height or length detection selected



height selected



length selected

For optimum performance in value mode with size detection the notes should be undamaged.

There are three options of value operation available:

1 Denomination entry
2 Automatic denomination
3 Fixed denomination

To choose one of these options you have to enter the supervisor mode, please refer to page 38.

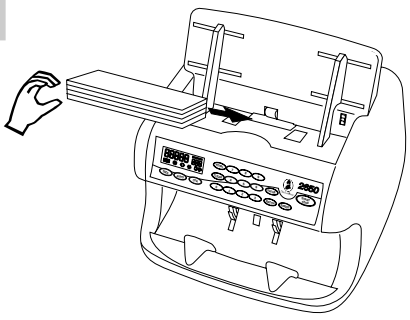
dEntr

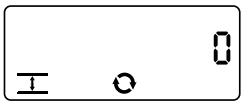
1 Denomination entry

The denomination of the notes is manually entered by the operator. The machine will check that all same notes counted are the same size.

count

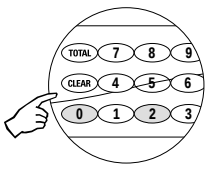
1

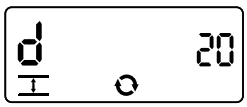




Place notes to be value counted in the hopper.

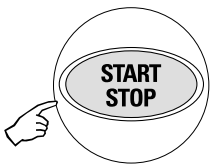
2





Key in the denomination of the notes to be counted.

3



Press the **START** key.

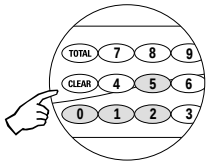
2650 value mode

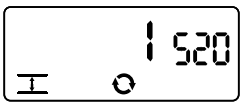
value with height or length detection selected

dEntr

dispense

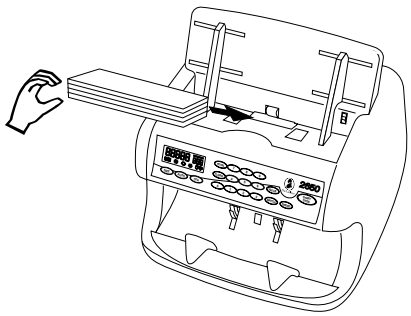
1





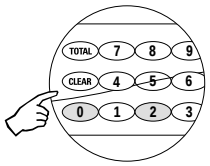
Key in the value to be dispensed.

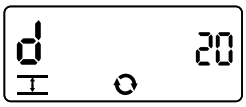
2



Place notes to be dispensed in the hopper.

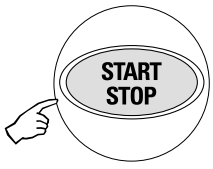
3



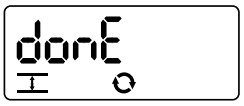


Key in the denomination of the notes to be dispensed.

4



Press the **START** key.



If the dispense amount has been completed successfully the display will show done.

2650 value mode

value with height or length detection selected

AdEn

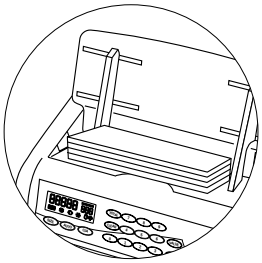
2 Automatic denomination

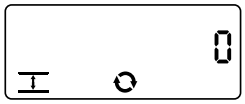
The first note of the bundle will be assessed and value assigned automatically for the rest of the count or dispense. (There may be a short pause while this process takes place).

The size of each subsequent note is checked against the denomination table held within the machine.
This table should have been set up by your De La Rue supplier.

count

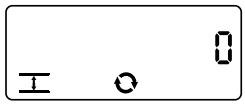
1



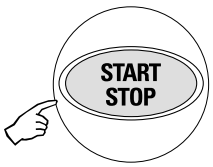


Place notes to be value counted in the hopper.

2



The machine will start automatically if **AUTO** has been selected, or



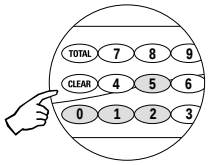
Press the **START** key.

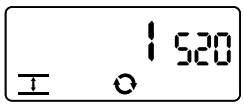
2650 value mode

value with height or length detection selected

dispense

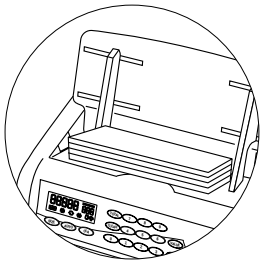
1





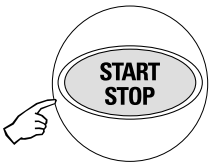
Key in the value to be dispensed.

2



Place notes to be dispensed in the hopper.

3



Press the **START** key.

If the dispense amount has been completed successfully the display will show done.

2650 value mode

value with height or length detection selected

FdEn

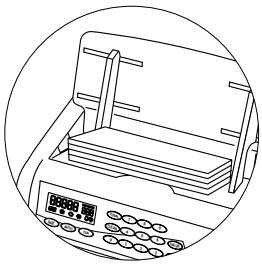
3 Fixed denomination

Entering a number from the size table index will choose a note size to be counted and assign the value from the size table to the note.

The size of each subsequent note is checked against the chosen size in the denomination table held within the machine. This table should have been set up by your De La Rue supplier.

count

1

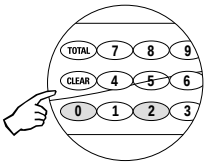


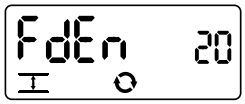
Place notes to be value counted in the hopper.

With **AUTO** selected, the machine commences count when notes are placed on the hopper using the most recently entered size table index number.

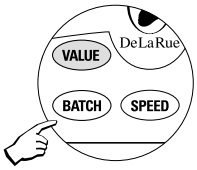
If **AUTO** is not selected, the current size table index number can be changed for each batch of notes.

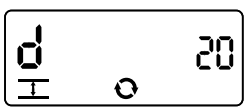
2





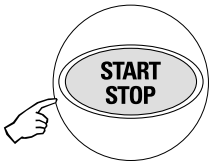
Key in the size table index number, corresponding to the size and value of the notes to be value counted.





Holding the **VALUE** key will indicate the value of the note corresponding to the chosen size table index number.

3



Press the **START** key.

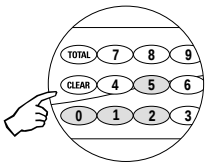
2650 value mode

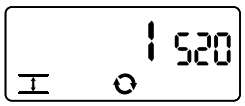
value with height or length detection selected

FdEn

dispense

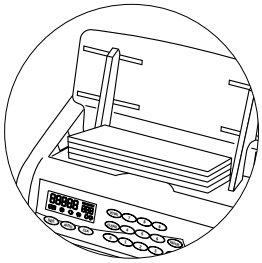
1





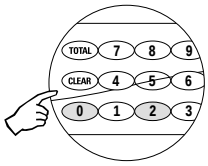
Key in the value to be dispensed.

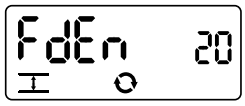
2



Place notes to be dispensed in the hopper.

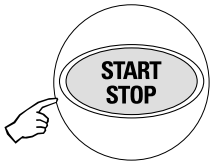
3



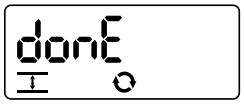


If **AUTO** is not selected, key in the chosen size index number corresponding to the required note size and value.

4



Press the **START** key.



If the dispense amount has been completed successfully the display will show **DONE**.

2650 value mode

value with height & length detection selected

dEntr
AdEn
FdEn

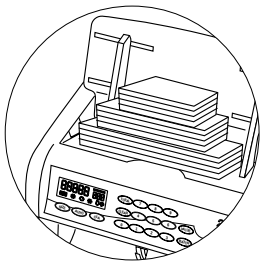
In value mode with both height & length selected you have the options of denomination entry, automatic denomination and fixed denomination that we have already described. In addition you have a further operation called 'special' which can be used for **mixed bundle counting.**

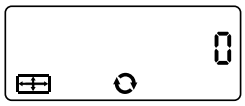
Special
Each note will be checked against the denomination table to identify its value while it counts or dispenses.

Note: For optimum performance there should be at least 5mm note size difference between denominations on the short edge dimensions or height, or at least 6mm note size difference between denominations on the long edge dimensions or length.

count

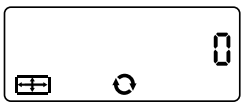
1



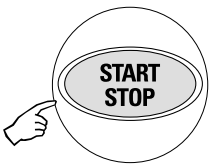


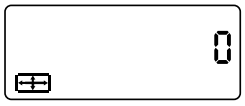
Place notes to be value counted in the hopper with large notes followed by smaller ones as shown.

2



The machine will start automatically if **AUTO** has been selected, or press the **START** key.





Press the **START** key.

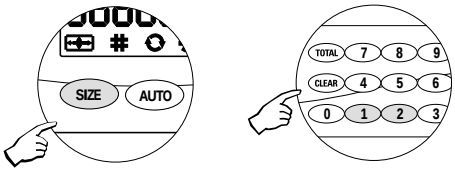
2650 currency selection

This section is applicable to 2650 models with 3D only

It is possible to value balance two currencies separately on the 2650 3D machines. This function should be set up by your De La Rue supplier.

On entering value mode (VAL) or dispense mode (DIS), the display shows briefly the currency selected:

Curr_ 1 or Curr_2

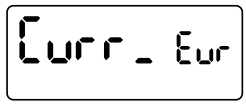


To switch between the two currencies, press and hold **SIZE**. Whilst holding **SIZE**, press 1 or 2 on the numeric keypad to select either currency 1 or 2. Release the **SIZE** button to confirm selection.

The total value of the notes counted is shown on the screen. If this total is not clear down, when the second currency is selected, it will be held in memory and can be returned to after processing the second currency. If Count mode is selected, the value totals are cleared.

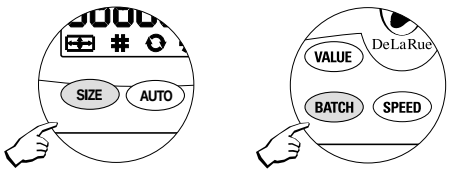
This section is applicable to 2650 models I+ and II+ only

It is possible to value balance up to five currencies separately on the 2650 machines with euro detection. This function should be set up by your De La Rue supplier.



On entering value mode (VAL) or dispense mode (DIS), the display shows briefly the currency selected:

Curr_ Eur (euros selected)

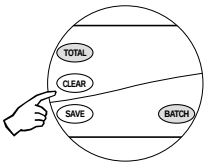


To switch between currencies, press and hold **SIZE**. Whilst holding **SIZE**, press the **BATCH** key to scroll through the currencies programmed. Release the **BATCH** key to confirm selection.

The total value of the notes counted is shown on the display. If this total is not cleared, when the second currency is selected, the original total will be held in memory and can be returned to after processing the second currency. If Count mode is selected, the value totals are retained by the counter.

batch sizes

changing batch sizes



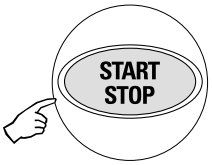
In this mode you can change the pre-set batch sizes.

Press **TOTAL** and **BATCH** to enter this mode.

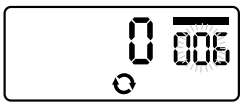
The batch bar will flash

Press **BATCH** repeatedly to select the batch size that you wish to change. The right hand digit of the 3 figure number will flash.

Press **CLEAR** to reset the batch quantity to zero if required.

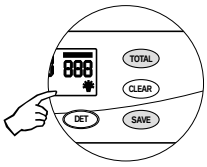


Press the **START** key repeatedly to choose the new right hand digit, between 0 and 9.



When the new digit is selected, press **SPEED** to move to the middle number, this number will now flash. Select the new digit using the **START** key and move to the left hand digit by pressing the **SPEED** key. Update the 3rd digit by repeatedly pressing the **START** key, to scroll from 0 to 9.

While the batch bar is still flashing, pressing the **BATCH** key repeatedly will allow selection of another batch size.



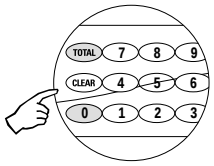
Press **SAVE** to store the new batch sizes in memory and exit the mode.

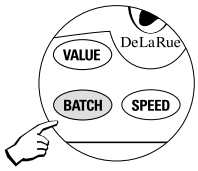
On exiting this mode, the batch sizes will automatically be stored into numerical order.

machine configuration

machine configuration

A range of operations is provided to enable you to alter the parameters of the machine. To enter these functions press and hold **TOTAL** and then press the key corresponding to the function you wish to change. These include machine configuration, speed, batch sizes, size operations, UV detection level, stacker limit and CMS settings.



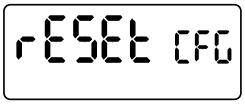


This operation allows you to save your own set up configuration of the machine in the memory, e.g. batch sizes, speed etc or to reset to the configuration held in the memory, or to reset to the factory defaults.

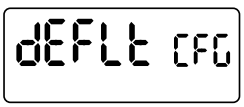
Press **TOTAL** and **0** to enter this mode.

Use the **BATCH** key to step through the functions.

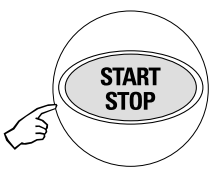
This saves the current machine setup in the memory. The machine will set itself to this configuration each time it is switched on.

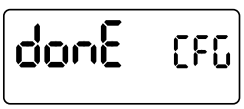


This resets the machine to the configuration previously stored in the memory.

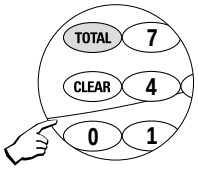


This sets up the machine to the factory default configuration. It will not change the machine set up that you have stored in the memory.





When you have chosen the required option, press the **START** key.

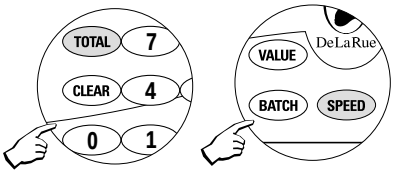


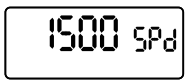
To exit this mode press the **TOTAL** key.

speed & batch

speed

This function does not apply to machines with € I, € II and € III detectors.

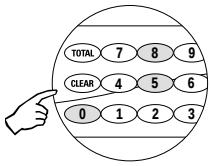


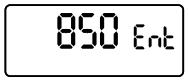


In this mode you can change the table of throughput speeds.

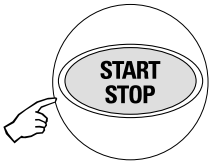
Press and hold **TOTAL** and **SPEED** to enter this mode.

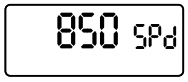
Select the speed you require to change by pressing the **SPEED** key repeatedly.



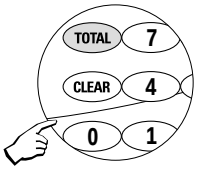


Input the speed you require by pressing the numeric keys and press **START**.





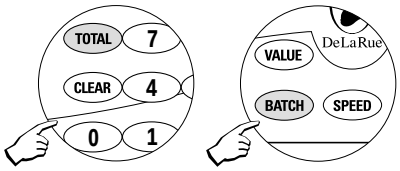
Four speeds can be set in the range 600 to 1500, and are sorted in descending order.

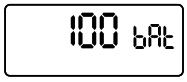


To exit this mode press the **TOTAL** key.

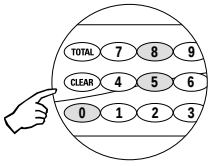
batch

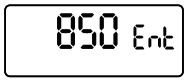
In this mode you can reset the table of batch sizes.





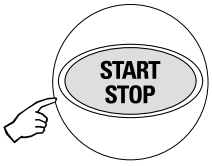
Press and hold **TOTAL** and **BATCH** to enter this mode.

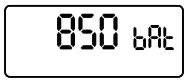




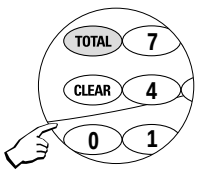
Select the batch size you require to change by pressing the **BATCH** key repeatedly.

Select the batch size you require by pressing the numeric keys and press **START**.





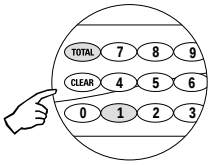
Six batch sizes can be set in the range 1 to 999, and are sorted in descending order.



To exit this mode press the **TOTAL** key.

size operation

size operation

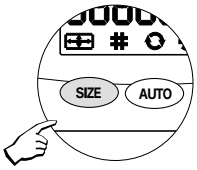


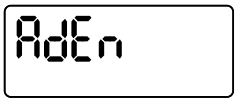
In this mode you can select the option of how the machine recognises and tests notes by size.

In any value mode enable size detection and press and hold **TOTAL** and **1** to enter this mode.

Press **SIZE** key to step to next option.

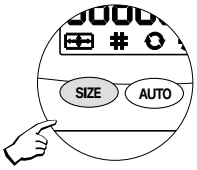
This option requires the note value to be manually entered.





Press the **SIZE** key to step to the next option.

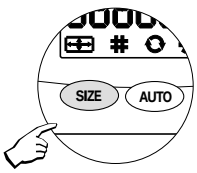
Automatic denomination option measures the size of the first note and compares this with the information in the denomination table. This should have been set by your De La Rue supplier. When it finds a match it attributes this value to the notes to be counted.

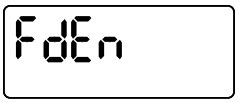


Press the **SIZE** key to step to the next option.

Special option measures the size of each individual note and compares this with the information in the denomination table. This should have been set by your De La Rue supplier. When it finds a match it attributes this value to the notes to be counted.

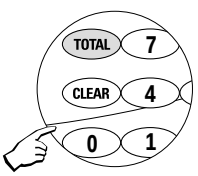
This option only operates on machines with 3D or + detection.





Press the **SIZE** key to step to the next option.

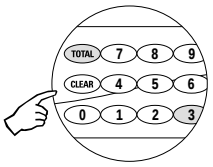
Fixed denomination option allows manual selection of the note size to be counted from the denomination table. This should have been set up by your De La Rue supplier. Notes matching this size selection will be assigned the value in the denomination table.

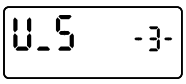


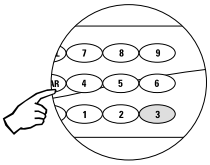
To exit this mode press the **TOTAL** key.

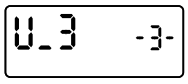
UV detection

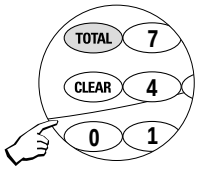
UV detection level











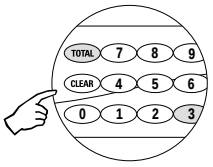
In this mode you can set the machine's UV detection level. To optimise performance you can choose a level between 1-9. 1 is the most sensitive setting.

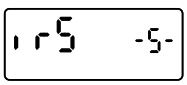
Press and hold **TOTAL** and **3** to enter this mode.

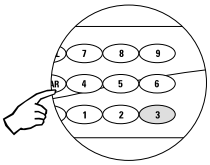
Use the numeric keys to select the level you require.

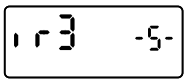
To exit this mode press the **TOTAL** key.

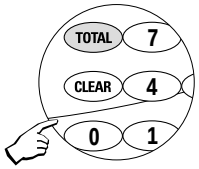
IR detection level











In this mode you can set the machine's IR detection level. To optimise performance you can choose a level between 1-9. 1 is the most sensitive setting.

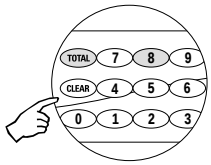
Press and hold **TOTAL** and **5** to enter this mode.

Use the numeric keys to select the level you require.

To exit this mode press the **TOTAL** key.

EMG detection level

EMG detection level

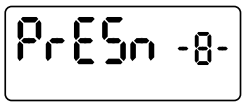


In this mode you can set the machine's EMG detection level.

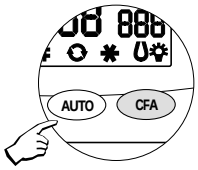
There are two settings depending on the currency being processed.

Press **TOTAL** and **8** to enter this mode.

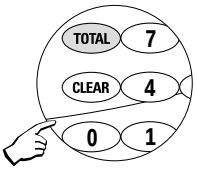
This mode is designed for magnetic ink on US$.



This mode is designed for magnetic ink on other currencies.



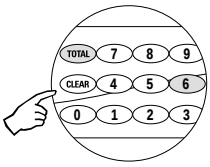
Press the **CFA** key to select the required mode of operation.

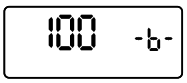


To exit this mode, press the **TOTAL** key.

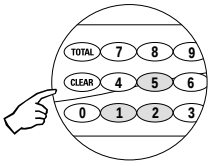
stacker limit

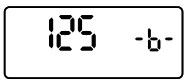
In this mode you can set the stacker limit. This is the maximum number of notes that the machine will allow to be counted before the stacker needs emptying.



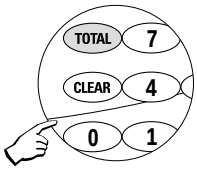


Press and hold **TOTAL** and **6** to enter this mode.





The count display will show the current stack limit.
The limit can be changed within the range of 50 - 200 by pressing the numeric keys.

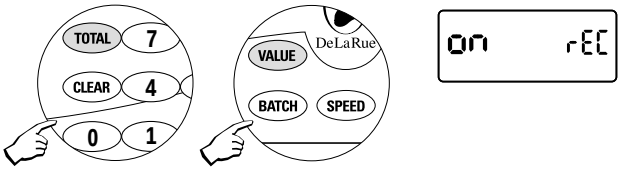


To exit this mode press the **TOTAL** key.

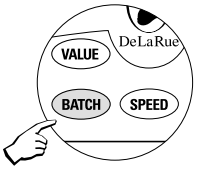
data recovery

recovery from power failure

In this mode count data and the basic operating mode can be stored during the period the machine is switched off. This gives the opportunity to recover data after a power failure.



Press and hold **TOTAL** and **VALUE** to enter this function, the current mode is displayed.

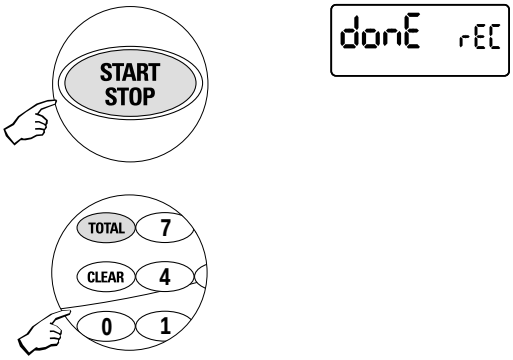


Press the **BATCH** key to step through the modes available.

on rEC - automatically restore data and count mode in operation prior to the power failure.

Auto rEC - automatically restore data and count mode only if the power failure was during a count run.

rEStr rEC - restores from memory the last successful count data stored.



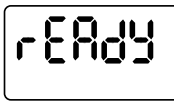
To select a mode, press the **START** key, when the desired mode is displayed.

Press **TOTAL** to exit supervisor mode.

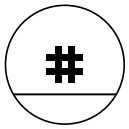
CMS Computer Link

This section is applicable to 2650 models without € detection

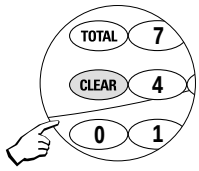
This feature provides the machine with an on-line (RS232) connection to link it to a computer.



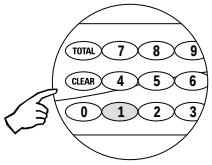
When the machine is switched on, the display will show that it is ready and is seeking a log-on from a host computer.

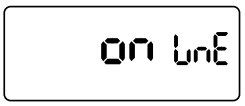


When the machine is on-line, the # symbol will be displayed.



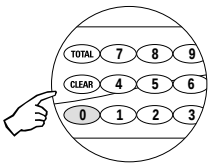
If the machine is not being used on-line, press **CLEAR** to switch into off-line operation.





To switch the machine from off-line to on-line operation, press **TOTAL** and 9.

Press 1 to switch the machine on-line.

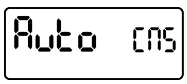


Press 0 to switch the machine off-line.

Press **TOTAL** to exit this mode.

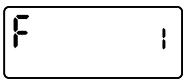
The on-line machine will operate in one of 3 modes, controlled by the host system.

1. Autodenomination
(Size detection must be on)



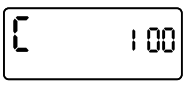
If the size detector is on, the machine measures the size of the first note. It attributes the value in the size table to all subsequent notes of the same size.

2. Fixed denomination
(Size detection must be on)



Press the **VALUE** key to display the size table index number of the notes to be counted. An index number between 1 and 20 can be chosen via the keypad.

3. Manual denomination
(Size detection not required)



If the size detector is off, press the **VALUE** key to display the value of the notes to be counted. This can be changed via the keypad.

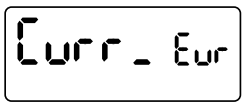
Press **START** to commence count.

CMS Computer Link

This section is applicable to 2650 models with €I, €II or €III

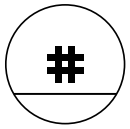
This feature provides the machine with an on-line (RS232) connection to link it to a computer.

The RS232 connection is made using the port marked 1 at the rear of the machine.



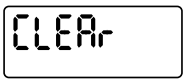
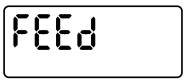
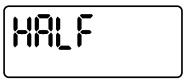
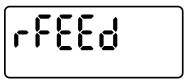
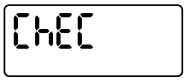
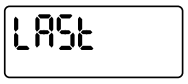
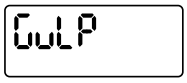
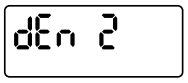
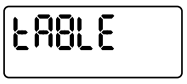
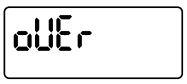
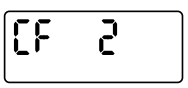
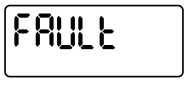
When the machine is switched on, the display will show the currency being used and then enters the selected mode of operation (value or count mode).

When on-line, the control of the note counter is performed by the host computer system. It is not possible to switch the counter off-line from the keypad of the note counter.

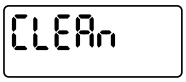
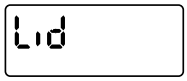
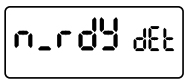


If the keypad of the note counter is disabled by the host PC, the # symbol appears in the display.

display messages

display	reason	solution
	Sensors in hopper, stacker and/or track sensor obscured by notes or dirt.	Remove notes and/or clean the sensors.
	Notes jammed in hopper, stuck together or too thick for note thickness setting.	Remove notes from hopper. Ensure that they are unstuck before refeeding. Alter note thickness setting if necessary (see setting up instructions).
	A half note has been detected by the machine.	Remove notes from stacker. Remove suspect note(s) from bundle and repeat the count. When the notes are re-fed, the count display returns to 0 or displays the total when the stacker was last emptied. Press **START** to continue.
	Notes are jammed in the machine transport.	Switch machine off. Open machine by pressing release buttons as shown on page 3. Remove notes carefully. Close machine. Switch machine on.
	The machine has stopped as a result of a note handling problem.	Remove all notes from stacker and repeat the count.
	This machine has stopped as a result of a badly damaged or degraded note.	Remove all notes from the stacker, remove damaged notes and repeat count.
	A note from the previous bundle is left in the transport.	Remove note and recommence count.
	3 or more notes have passed through the machine together.	Remove all notes from stacker. Remove suspect notes from bundle and repeat the count.
	2,3... A different size note has been identified which is the 2nd, 3rd... note down in the stack of notes.	Examine suspect note indicated. Either return notes to the stacker or replace with correct size notes. Press **START** to continue the count, or return remaining notes to the feeder and press **START** to recommence the count.
	Did not recognise the size of a note among the pre-set sizes of the denomination table, or the table not programmed.	Remove all notes from stacker. Remove suspect notes from bundle and repeat the count, or refer to supplier.
	Only appears in value mode and shows that a higher value than originally requested has been dispensed.	Replace notes with lower value in hopper.
	2,3... A suspect note has been identified which is the 2nd, 3rd... note in the stack of notes. This will cause the relevant symbol to flash (i.e. EMG and/or UV).	Examine suspect note or range indicated. Either return notes to the stacker or replace with valid notes. Press **START** to continue the count, or return remaining notes to the feeder band press **START** to recommence the count.
	A fault has been defected in the machine.	Switch off the machine and contact your agent's service engineer.

display messages

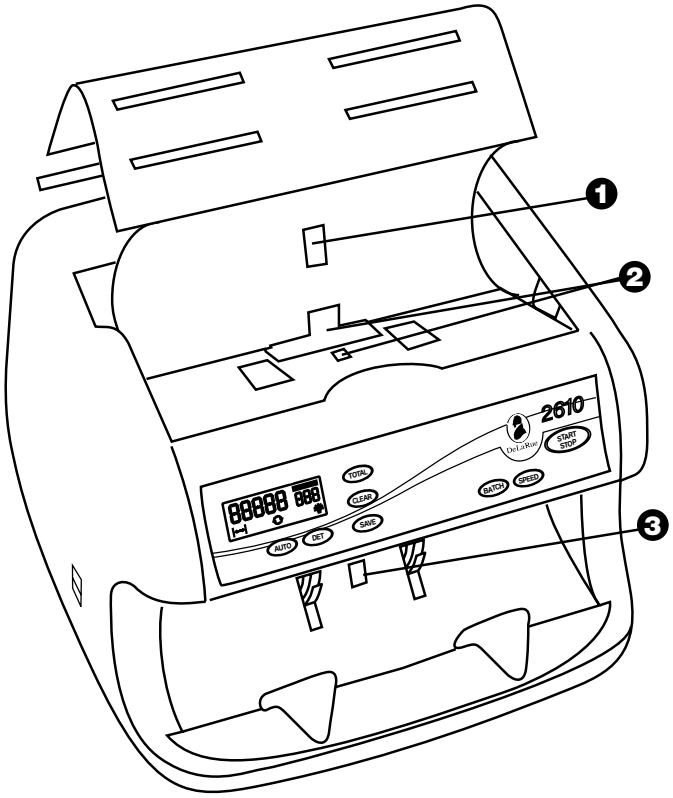
display	reason	solution
	Dust from banknotes is obstructing the machine's sensors.	Clean the machine internally (See page 47).
	The top of the machine has been opened to allow for a jammed note to be removed, or for cleaning.	Ensure the lid is closed correctly and that both latches are secure. Press **START** to clear the display.
	In Dispense mode, the dispense amount cannot be completely because the denomination set is larger than the remaining value required.	Place a new denomination in the hopper, press **START** and input the new denomination to complete the dispense.
	A selected detector failed to start properly. The icon for the affected detector will flash. This may be due to dirt in the transport.	Check and clean the transport. Remove all notes and repeat the count.

specification

Mains voltage	nominally 98v - 264v AC, 50/60Hz
Power consumption	150W max at 1500 npm
Acoustic noise level	<81dBA at 1500 npm
Dimensions	
Height	190mm
Width	300mm
Depth	260mm
Weight	6kg
Document size range	190 x 90mm maximum 100 x 50mm minimum
	170 x 90mm 120 x 50mm } if size detection available
	On Euro machines: 160 x 90mm max 120 x 50mm min Larger note sizes may be processed, but optimum performance may not be achieved.
Throughput speed	2610 600/1000/1200 notes per minute (pre-set) 2650 600-1500 notes per minute variable
Hopper capacity	500 notes
Stacker capacity	200 notes

specifications

routine maintenance



The sensors in the machine can fail if they are obscured by dirt.

Switch the machine off.

Using a dry cloth, clean the hopper, stacker and track sensors and prisms (1, 2 and 3).

The size detection sensors may be cleaned with the cleaning swabs supplied.

Contact your De La Rue supplier for additional cleaning swabs.

DE LA RUE

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Reference: TP05313013 - ISS1

Appendix 7

IR Detector System

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2.	OPERATION	3
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Illustrations

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Figure 2	IR Detector System Interconnection Diagram	13

1. INTRODUCTION

This detector suite is housed in a multi functioning detector assembly and is controlled by a single detector controller PCB. With full functionality enabled the detectors will provide a method of determining if a banknote has the correct Ultra Violet and Infra Red properties. It will also determine the long and short edge lengths of a banknote.

2. OPERATION

The IR detector consists of a sensor array, mounted in the detector box and a corresponding set of IR led arrays, housed in the three LED supports, located within the transport. Data received from the array is compared to note data held in the detector controller. The controller determines the banknote's IR and long edge size characteristics. The short edge measurement is achieved by two SD sensors, also mounted within the detector assembly. The two sensors work in conjunction with two SD emitters mounted inside the centre LED support. The SD sensors also act as the transport sensor on this variant.

An integral, LED based, UV Detector determines the UV characteristics of the banknote.

The SD and 3D detectors operate as detailed in Appendices 9 and10.

The IR and UV features are enabled or disabled by pressing the CFA key. The IR feature is represented by the '*' icon on the display.

The IR Detector System electrical interconnections are shown in Figure 2.

The mechanical and electrical items specific to the IR detector are detailed in the Key to Figure 1.

3. DETECTOR CONTROLLER

The detector controller processes the data gathered by the various sensors within the detector assembly and passes value and counterfeit information to the main controller (via the motor controller). The size table, CMS protocol and note IR characteristics are stored in flash memory within this controller PCB.

The detector controller is fitted with two RS232 ports.

Port 1: This port allows connection to a host computer. Detector configuration, Size and IR data are all downloaded to the controller via this port.

Port 2: This port is reserved for future use.

The detector controller carries a unique internal identifier which, when applied with an enabling code, unlocks the various features of the detector. For further details on unlocking detector features refer to Appendix 12, Value added software.

Note: A new enabling code will be required if the detector controller is to be replaced.

4. REMOVAL AND REPLACEMENT

4.1 IR Sensor Assembly Removal

To remove the detector assembly from the detector box base proceed as follows:

a. Remove the detector box lid. Disconnect the earth wire and the cables from SK4, SK5 and SK6 of the detector controller PCB and then lift off the detector box base.

b. Remove the two M4 nyloc nuts and nylon washers securing the detector controller PCB to the controller mounting frame. Place the detector controller to one side.

c. Release the clamp spacers by removing the two clamp screws.

d. Remove the two screws securing each of the controller mounting brackets and the detector retainers to allow the detector PCB to be lifted from the detector box base.

4.2 IR Sensor Assembly Replacement

To replace the IR sensor assembly proceed as follows:

a. Relocate the IR detector PCB within the detector box base. Refit the controller mounting bracket and the detector reatiners, tightening the two screws to 1 Nm.

b. Ensure the compression springs are inserted into the clamping spacers. Refit the clamping spacers, ensuring that the clamp screws are fully tightened.

c. Reconnect the cable from the detector controller PCB and refit the controller.

Note: Ensure that the nylon washers are fitted and that the nyloc nuts are not overtightened.

d. Refit the detector box to the stacker hopper and reconnect the remaining cables.

4.3 LED Support Removal

Note: This procedure should only be carried out if the LED supports are to be replaced.

To remove the LED supports proceed as follows:

a. Remove the detector box from the machine as detailed in paragraph 4.1a.

b. Split the machine halves as detailed in Section 6, Paragraph 2.2. Note the additional ribbon cable. The cable tie must be cut and the cable withdrawn from the stacker hopper, note the cable routing to aid replacement (see Figure 1, sheet 2).

c. Remove the chassis assembly as detailed in Section 6 paragraph 2.3 a to e. Do not attempt to remove the central support at this stage.

d. Note the cover plate LV1 must be removed to enable access to the chassis securing screws.

e. Loosen the clip feature and glued retainers on the 3 LED supports and loosen the adhesive pad below the ribbon cable connector on the flexi circuit.

f. Loosen the screws at either end of the double detect shaft and remove the two remaining screws that secure the bearing housings to the chassis.

g. Carefully lift out the Double detect and drive roller assembly. Withdraw the LED supports from the chassis.

4.4 LED Support Replacement

Replacement is the reverse of the removal procedure. The following points should be observed.

a. Do not bend or crease the flexible circuit.

b. Ensure the flexible circuit is secured under the clear plastic strip attached to the chassis.

c. Attach the flexi circuit to the chassis using the adhesive pad under the connector.

d. Replace all cable ties that were removed.

e. Place glue under retainers.

KEY TO FIGURE 1			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
1	M4 NYLON INSERT LOCKNUT	00461502	2
2	SCREW STAP No6 X 1/2 PAN POZI	00465218	4
3	SPRING COMPRESSION LC 023AB 6 MW	02430436	2
4	SCREW M4 X 12 PAN POZI/WASHER	02460343	2
5	BRACKET D/A DET. CONTROLLER	2602310603	2
6	3D IR LED D/A	2602310802	1
7	CLAMP, FLEXI D/A	2602315901	1
8	CBLFM SENSOR/CONTROLLER	2606007701	1
9	CBLFM IR LED	2606007803	1
10	CBLFM SYSTEM INTERCONNECT	2606008001	1
11	PCBP 3D UV IR CMS CONTROLLER	S3–2609539504	1
12	PCBP 3D UV IR SENSOR	S3–2609539904	1
13	SPACER, 3DUVIR SENSOR PCB	2620023801	2
14	DETECTOR RETAINER	2643001701	2
15	MOTOR CONTROL PCB KIT (EURO)	2604540002	1
16	FEED MOTOR ASSY – BUHLER B8	2602013201	1
17	PLATE COVER LV1 DETECTOR	2616007801	1
18	MAIN CONTROLLER KIT	2604536602	1
19	FEED HOPPER ASSY (EURO)	2602310301	1
20	STACKER HOPPER	2602315801	1
21	CHASSIS B9	2616007102	1
22	NYLON WASHERS	00461752	2

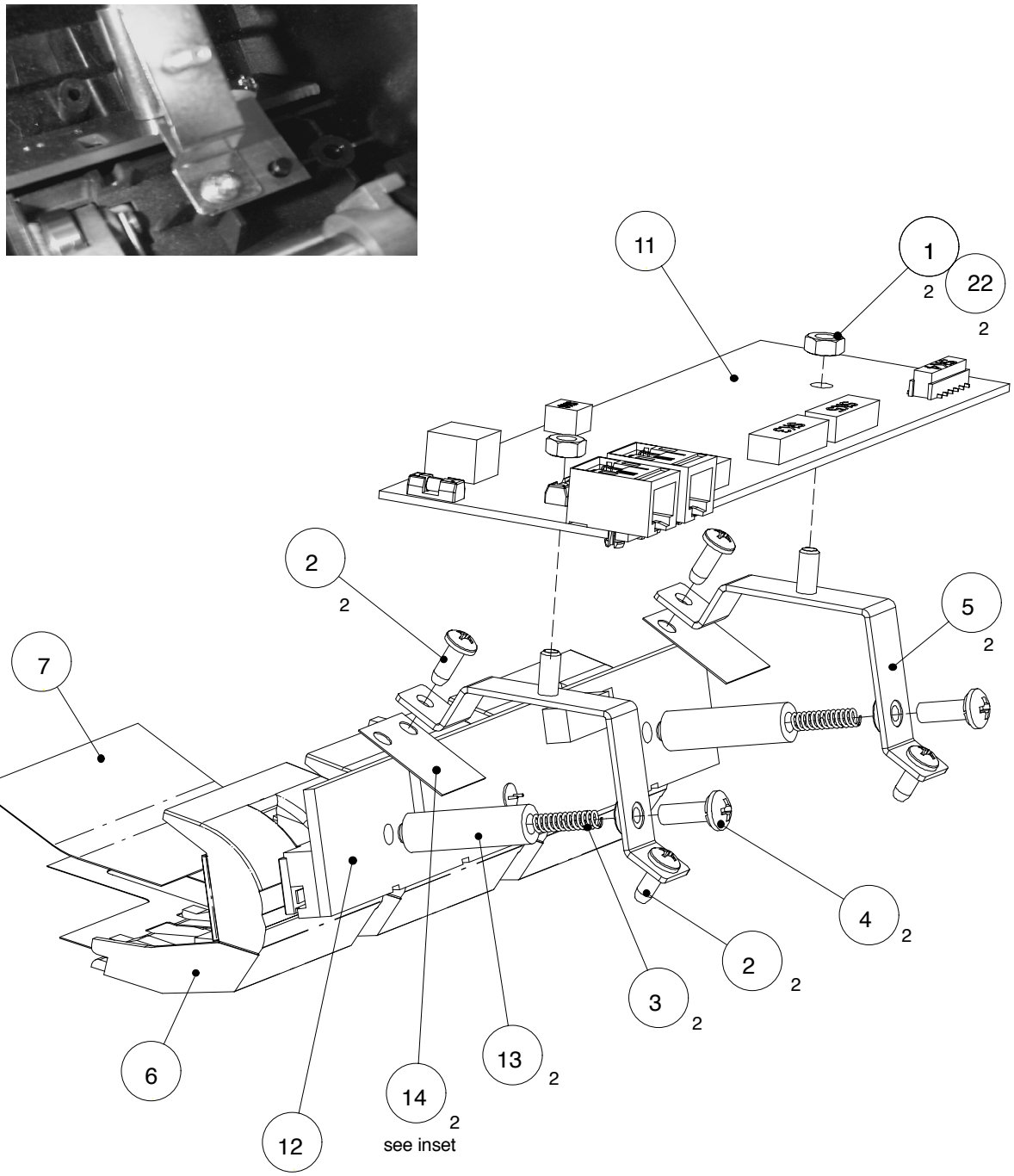


Figure 1. IR Detector System – sheet 1

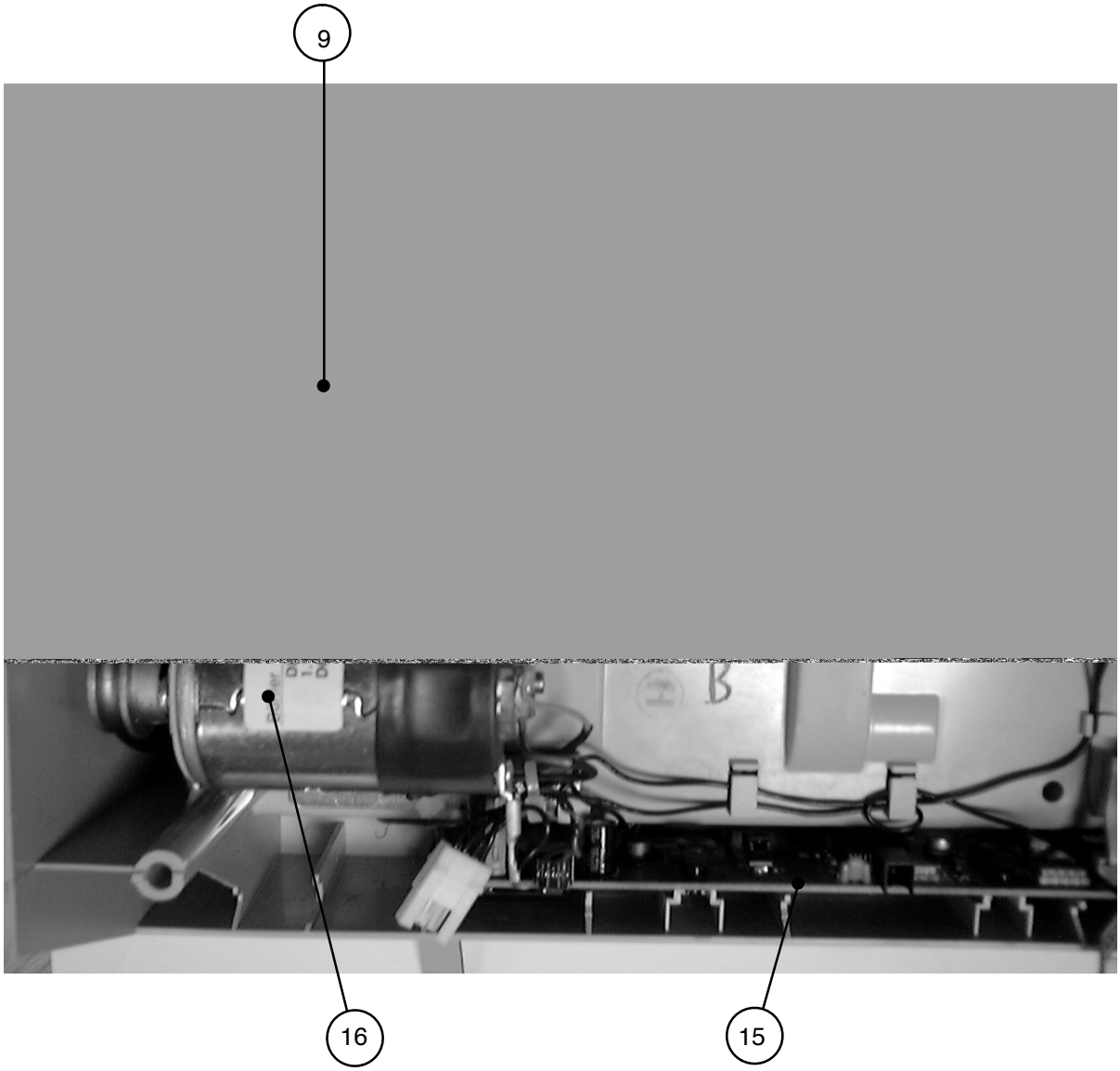


Figure 1. IR Detector System – sheet 2

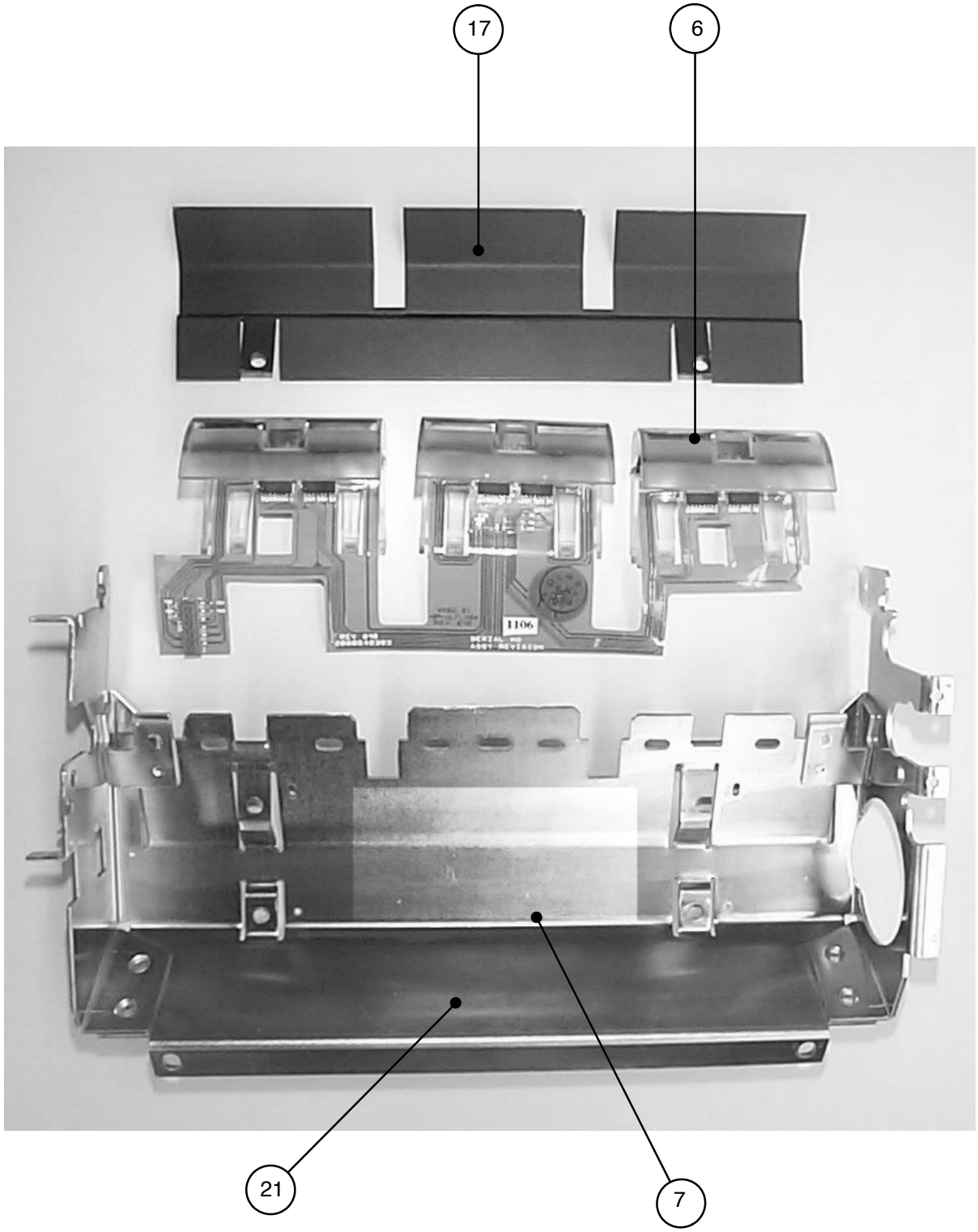


Figure 1. IR Detector System – sheet 3

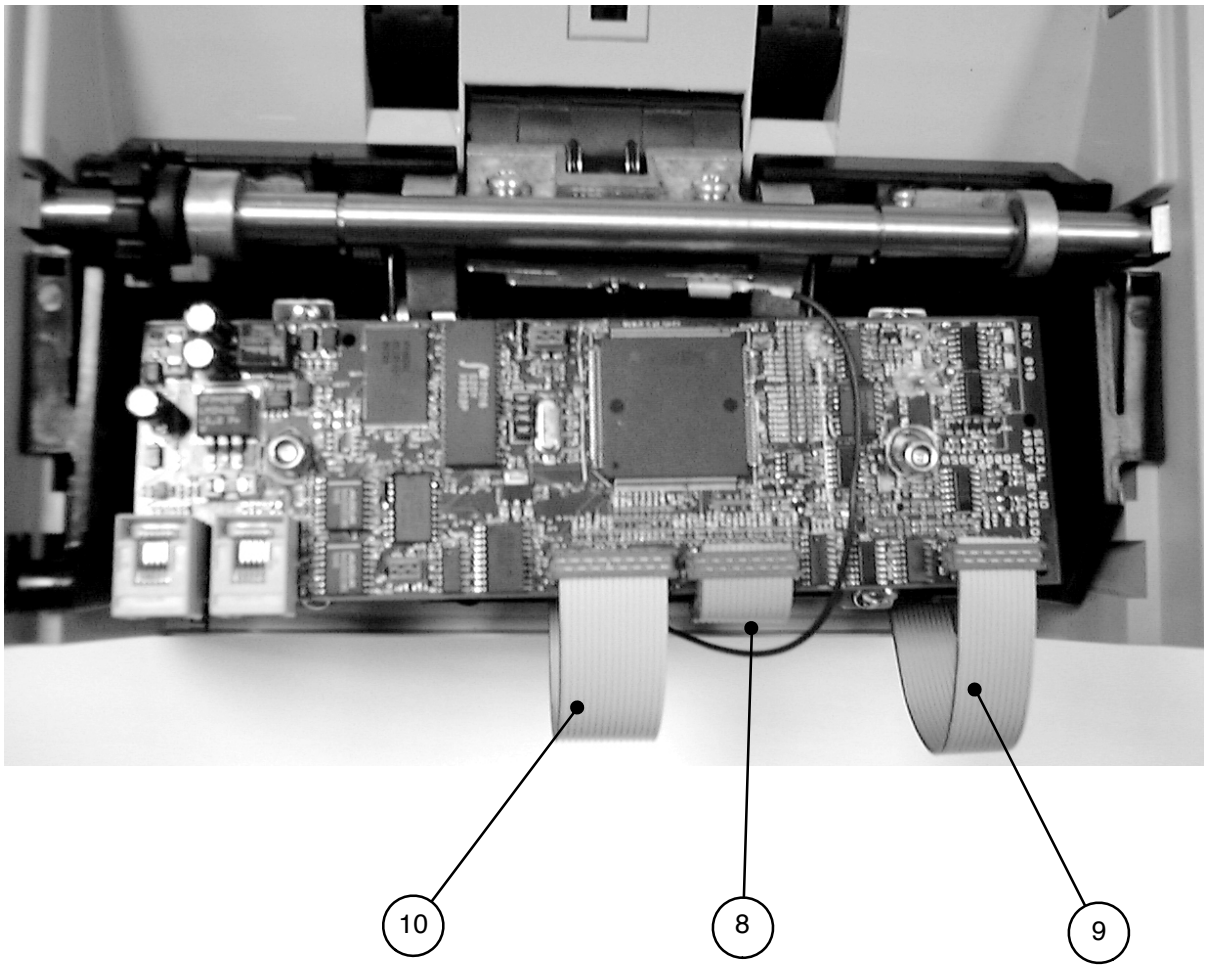


Figure 1. IR Detector System – sheet 4

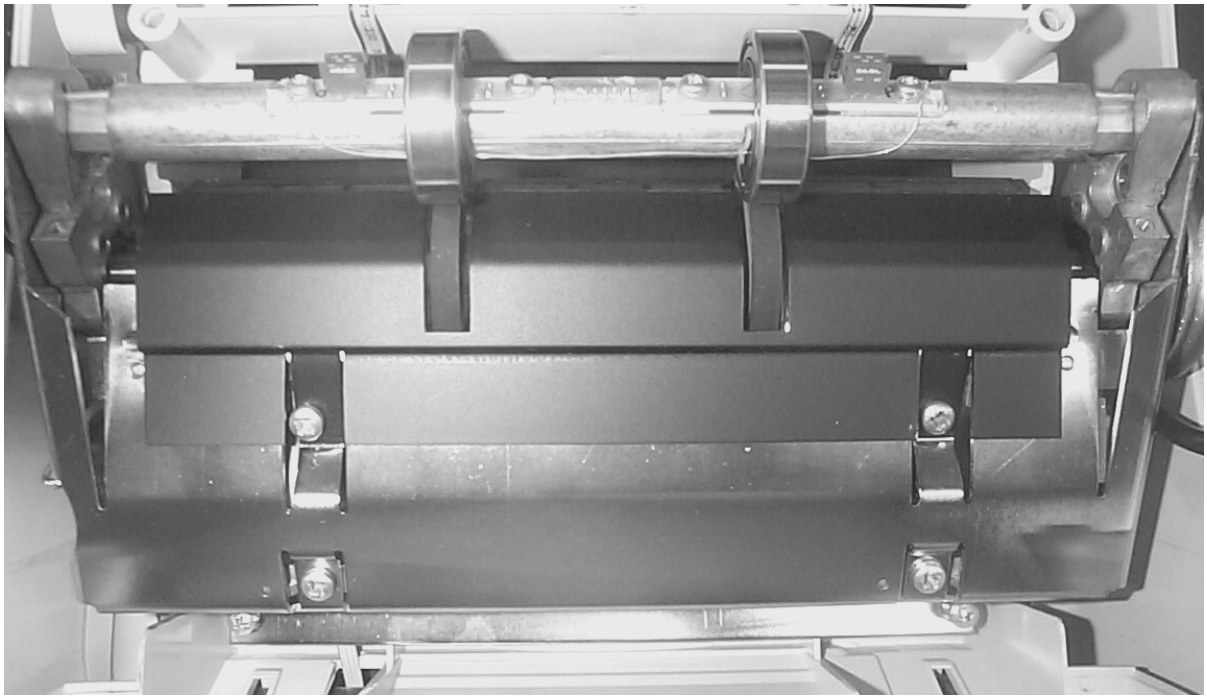
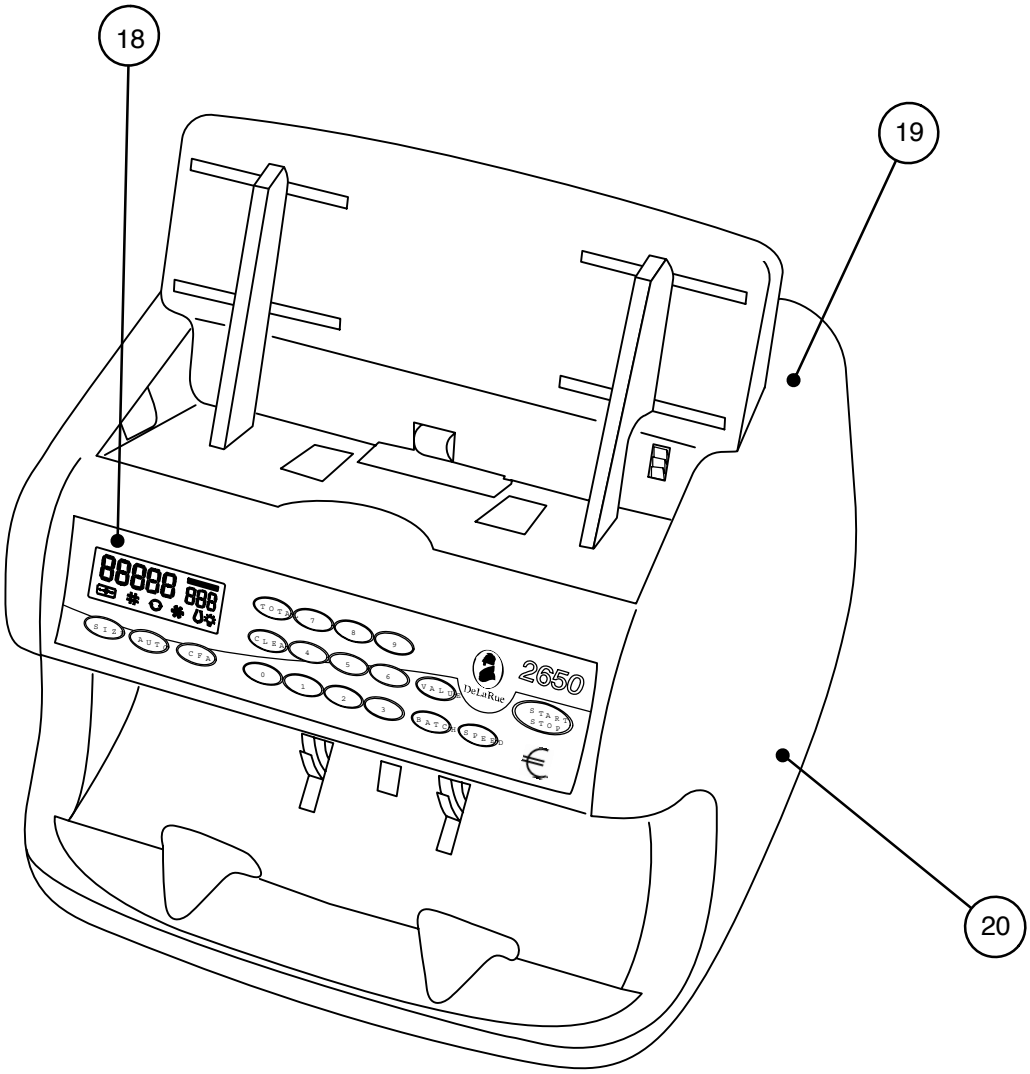


Figure 1. IR Detector System – sheet 5

Main Controller
Kit not shown



Note : IR Detector System and
Superior Magnetics Detection System
feed hopper is different to the standard
B9 machines.

Figure 1. IR Detector System – sheet 6

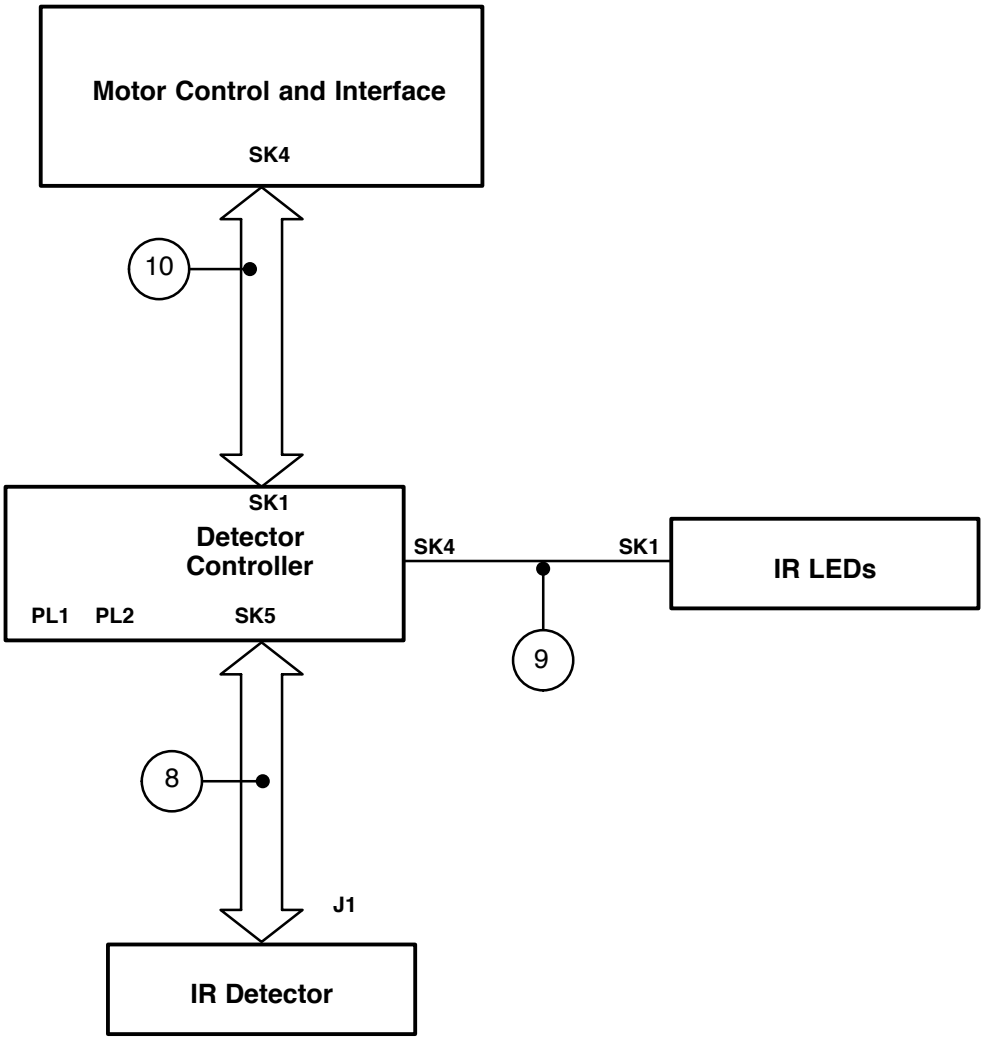


Figure 2. IR Detector System Interconnection Diagram

Appendix 8

Superior Magnetic Detector System

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1.	INTRODUCTION	3
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3.2	The Detector Interface	3
3.3	The Detector Processor	3
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1. INTRODUCTION

The Superior Magnetic Detector System (SMDS) detector head is bonded into the detector box base. Two detector PCBs are used to interpret the detector output and report data to the main controller.

When full functionality is enabled, the detector can analyse the notes magnetic properties to determine its denomination and authenticity.

2. OPERATION

The Superior Magnetic Detector System's counterfeit detection aid, may be switched on or off by pressing the CFA key.

Pressing the SIZE key will activate denomination detection on EIII + variants.

3. DETECTOR CONTROLLER

3.1 The Detector

The detector consists of an array of magnetic heads, which covers the majority of the notes width. Three sets of rollers are mounted opposite the detector head to ensure the notes make adequate contact with the magnetic heads.

Port 1: This port allows connection to a host computer. Detector configuration, Size and IR data are all downloaded to the controller via this port.

3.2 The Detector Interface

Signals from the detector are passed to the Detector Interface PCB for initial processing. The track sensor signals are also fed into the Detector Interface PCB to provide note–positioning information.

The resultant signal is then passed to the Detector Processor PCB for comparison with its internal note data.

3.3 The Detector Processor

The detector processor receives the data gathered by the detector interface and passes value and authenticity information to the main controller (via the motor controller).
The notes magnetic characteristics and the CMS protocol are stored in flash memory within the Processor PCB.

The detector controller is fitted with two RS232 ports.

Port 1: This port allows connection to a host computer. Detector Configuration, Size and IR data are all downloaded to the controller via this port.

Port 2: This port is reserved for future use.

This controller carries a unique internal identifier which, when applied with an enabling code, unlocks the various features of the detector.

For further details on unlocking detector features, refer to Appendix 12, Value Added Software.

Note: A new enabling code will be required if the detector controller is to be replaced.

4. REMOVAL AND REPLACEMENT

Note: magnetic tools should not be used on this product.

4.1 SMDS Detector Removal

The detector head is bonded into the detector box base, it is therefore necessary to replace the detector box base if a new detector is required. The procedure for removing the detector box base and its components is as follows:

a. Remove the detector box lid

b. Disconnect the ribbon cable from Socket 3 (SK3) of the Detector Controller PCB (lower PCB).

c. Disconnect the earth wire from the spring anchor plate.

d. Depress the two actuator buttons to release the front of the detector box.

e. Tilt the detector box backward and lift the detector box from the feed hopper.

f. Disconnect the ribbon cable from Socket 5 (SK5) of the DETECTOR INTERFACE PCB (upper PCB)

g. Disconnect the track sensor from Socket 6 (SK 6) of the DETECTOR INTERFACE PCB. (Upper PCB)

h. Using a 7mm spanner remove the clamp screw that is situated in the center at the left hand end of the DETECTOR INTERFACE pcb.

i. Using a 7mm nut runner remove the nyloc nut that is located in the center at the right hand end of the Detector controller

j. Carefully lift of both off the PCB's.

k. The pcb's may be separated by gently easing the 2 connectors apart.

l. The separation assembly may be removed and dismantled. Refer to Section 6, Page 7, Paragraph 2.8 for details.

Note: The detector head should not be removed from the Detector box base.

4.2 SMDS Detector Replacement

a. Refit the separation assembly if previously removed. Refer to Section 6, Page 8, Paragraph 3.1.

b. Reconnect the two pcbs ensuring the connectors are correctly aligned and fully engaged.

c. Carefully place the pcbs onto the mounting studs and secure with the clamping screw and nyloc nut. Torque to 0.8 N/m.

Note: Care should be taken not to over tighten these fixings, as this will damage the PCB's.

d. Refit the detector box to the feed hopper.

e. Reconnect the earth wire to the spring anchor plate and the track sensor cable to Socket 6 (SK6) of the DETECTOR INTERFACE PCB.

f. Refit the ribbon cables to Socket 5 (SK5) of the DETECTOR INTERFACE PCB and Socket 3(SK3) of the detector controller.

g. Replace the detector box lid.

h. Check and re–adjust the separation gap if required

4.3 SMDS Roller Supports Removal

In order to remove the roller supports is necessary to separate the two machine halves. This is should be done in accordance with Section 6, Page 4, Paragraph 2.2.

a. Remove the internal note guide by unscrewing the two screws securing it.

b. With the chassis exposed, using a 5.5mm spanner, remove the 4 screws which secure the roller support mounting plate to the chassis.

c. Loosen the clip features securing the roller supports to the mounting plate and lift out the roller supports*. (On early machines these may be secured by adhesive. The adhesive is no longer required).*

Note: The roller supports are not serviceable parts and must be replaced as an assembly. It is recommended that all three supports be replaced at the same time

4.4 SMDS Roller Supports Replacement

a. Insert the roller supports into position within the chassis.

b. Fix each of the roller supports to the mounting plate. Ensuring the clip feature is fully engaged.

c. Loosely fit the four screws securing the mounting plate to the chassis.

d. Fit the internal note guide, securing fully with the two screws.

e. Re–assemble the machine in accordance with Section 6, Page 13, Paragraph 3.7.

f. SET THE GAP WITH THE JIG.

g. Refit the detector box base.

h. Check and re–adjust the separation gap if required.

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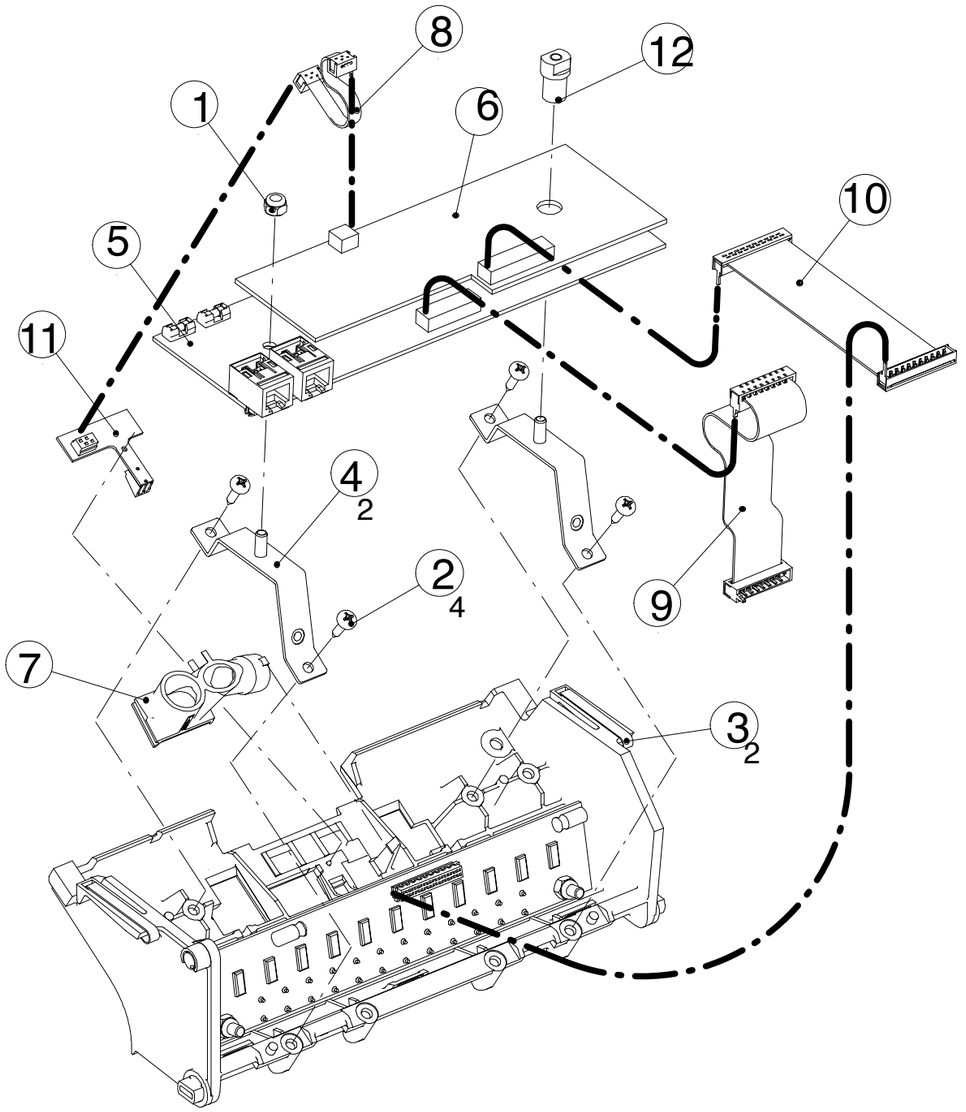
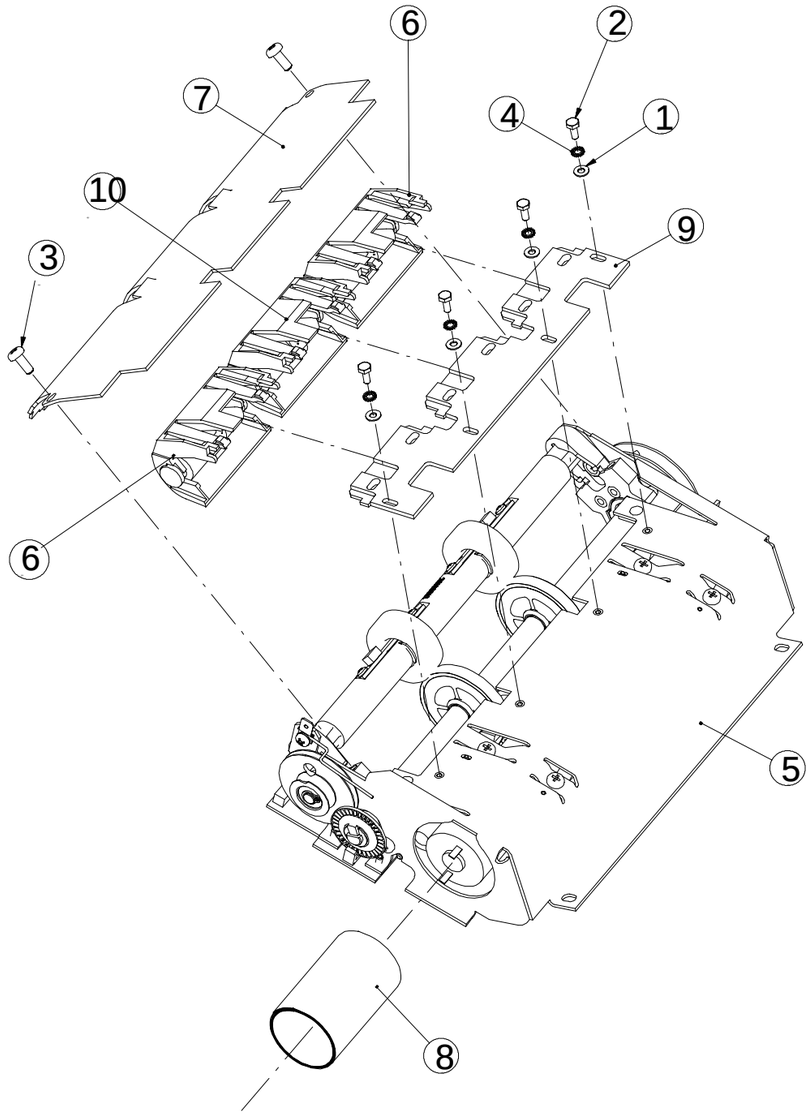


ITEM	DESCRIPTION	Part No
1	Nut Nyloc M4	00461502
2	Screw Stap N06X1/2	00465218
3	Clip Det Box Spring Assist	2616002601
4	Bracket D/A Det. Controller	2602310603

ITEM	DESCRIPTION	Part No
5} 6}	SMDS Det PCB } Option Kit }	2604312402
7	UV Detector Body Assy	2602318601
8	Cblfm Transport Sensor	2606007901

ITEM	DESCRIPTION	Part No
9	Cblfm System Interconnect	2606008001
10	Cblfm Sensor LV2	2606008102
11	PCBP Ref Track Sensor	2609535504
12	Clamp Nut – LV2	2620025001

Figure 1: Detector Box Assembly



ITEM	DESCRIPTION	Part No
1	Washer M3 Forma MS ZCEP	00460304
2	Screw M3X8 HEX MS ZCEP	00462702
3	Screw Stap M4 X 10 Pan Pozi	00462915

ITEM	DESCRIPTION	Part No
4	Washer M3 Forma MS ZCEP	02460259
5	Chassis Assy SMDS	2602318101
6	Roller Support assy SMDS	2602318501

ITEM	DESCRIPTION	Part No
7	Note Guide, Reprofiled	2616000705
8	Shield, motor, Feed	2616007301
9	Plate, Roller Support MTG SMDS	2620025501
10	Support Long Roller	2602319301

Figure 2 Chassis Assembly

Appendix 9

Size Detector SD
(non Euro machines)

CONTENTS

1.	INTRODUCTION	3
2.	OPERATION	3
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Illustrations

Figure 1	SD Detector (3 sheets)	5
Figure 2	SD Interconnection Diagram	8

1. INTRODUCTION

This option provides a note size detector to measure/evaluate the short edge dimension of the document. This SD facility enables users to identify rogue denominations in a bundle of notes, provided the size difference is large enough between adjacent denominations. In VALUE mode it also enables the machine to identify the denomination of a note, given that the machine has been preloaded with denomination/size information and that the size difference is large enough between adjacent denominations.

2. OPERATION

The size detector uses two transmissive optical sensors mounted inboard of the drive rollers to detect the presence of documents. The signals from the detectors are fed to, and processed by, the size controller PCB.

Note: The size controller PCB, item 256, is common to SD and 3D options.

The note size measurement is calculated by processing the signals from the optical sensors to determine the position of the leading and trailing edges of the notes. Compensation for skew is applied to the signal data and the subsequent size measurement is then compared with calculated limits to determine the notes acceptability.

If the note size measured is not acceptable the machine will stop and display a ‘dEn x’ message indicating the position of the suspect note in the stacked note pack. Without removing the notes from the stacker, the operator may examine the suspect note and continue counting, if required, by pressing the ‘START’ key, including the suspect note in the count. If all notes are removed from the stacker, the count must be repeated.

The size detector may be disabled by pressing the ‘SIZE’ key, causing the ‘SIZE’ icon on the display to be extinguished. Pressing this key again will re–enable the detector.

The electrical interconnections between the SD electronics and the rest of the machine are shown in Figure 2 – SD Interconnection Diagram.

The mechanical and electrical items specific to SD are shown in the Key to Figure 1.

3. REMOVAL AND REPLACEMENT

The SD controller PCB is clipped into the stacker hopper.

One half of the sensor pairs is attached to the internal noteguide. Remove the stacker hopper and internal noteguide from the machine and unbolt the sensor assembly from the noteguide. Note that this operation will require a ‘Torx’ (T8) screwdriver.

Before removal note the cable routings to aid re–assembly.

The other half of the sensor pairs is fitted to the central support lower via a flexi–circuit which is bonded to the chassis. This circuit should not be removed from the chassis unless it is to be replaced.

To replace the SD Detector reverse the above procedure. Care should be taken when refitting the sensor assembly to the internal noteguide not to create a burr on the head of the 'Torx' screw as it is in the note path and could cause damage to the notes.

KEY TO FIGURE 1

ITEM	DESCRIPTION	PART NO	QTY
155	CBLFM. SD (FINISHED)	2606003502	1
158	CBLFM. SIZE CONTROLLER	2606002001	1
200	2600 B8 MAIN CONTROLLER PCB KIT	2604536704	1
240	PCBP SD DETECTOR SENSOR	2609531305	1
256	2620 V2 SIZE DETECTOR KIT	2604534602	1
263	SHIELD, SD, PCB, D/A	2602013302	1
375	CLAMP, SD DETECTOR PCB	2614006401	1
453	INT N/GUIDE – SD	2616006301	1
647	PCBP SD FLEXIBLE	2609533206	1
738	CLIP CBL SAD NYN 19 x 19 BASE	01002882	3
807	SCREW STAP M4 x 10 PAN POZI	00462915	2
826	STAND OFF RHICHO SRT–3555B	02460406	2
827	SCREW STAP K30 x 12 TORX CSK	02460588	1
831	TYWRAP 92/102LG	00470401	5

The supervisor and engineer diagnostic functions for SD are detailed in Appendix 2 of this manual.

Maintenance required includes the cleaning of the emitter and sensor devices fitted to the Detector Sensor PCB (item 240) and the SD Flexi PCB (item 647).

If either of the detector PCBs (item 240 or item 647) are replaced, the machine must be recalibrated in accordance with Appendix 1 (2610) or Appendix 2 (2650) of this manual.

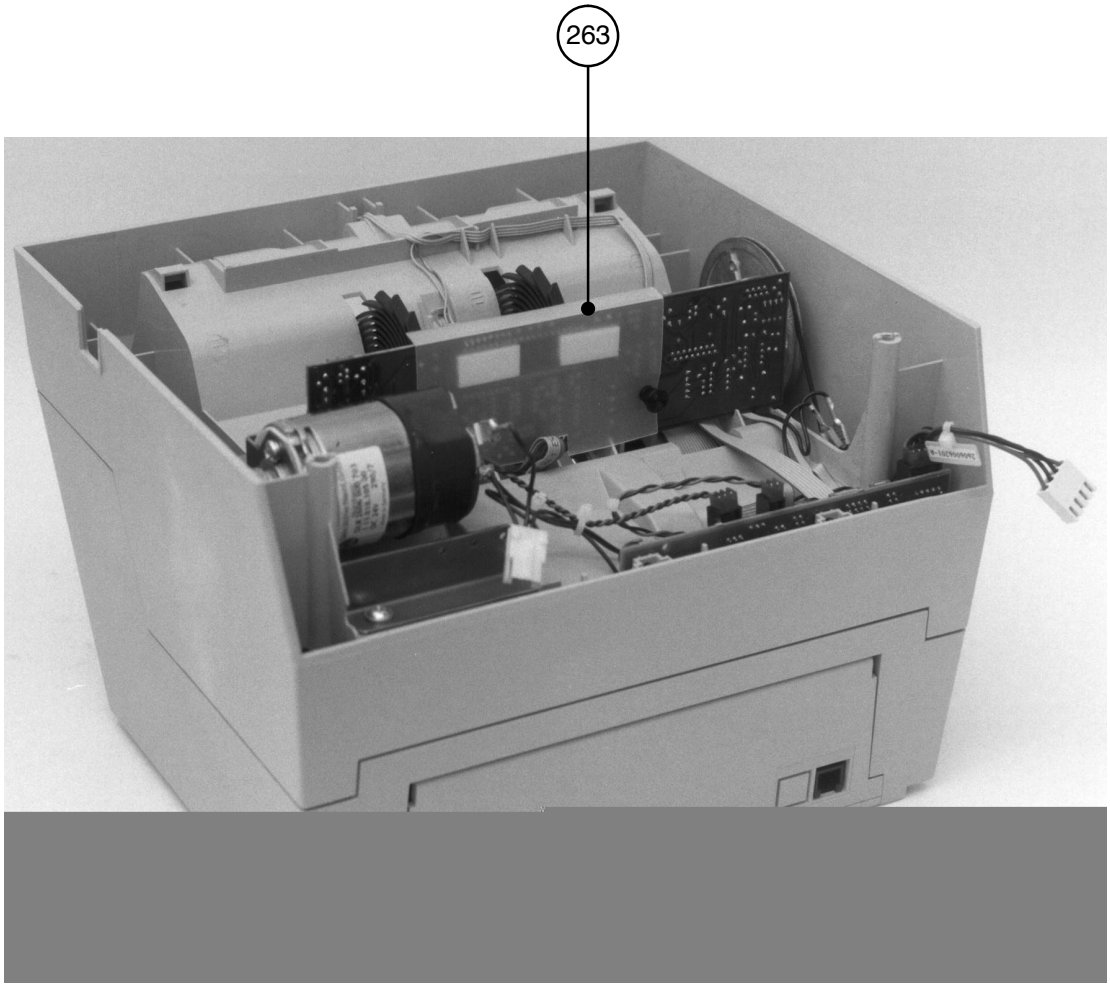


Figure 1. SD Detector – sheet 1

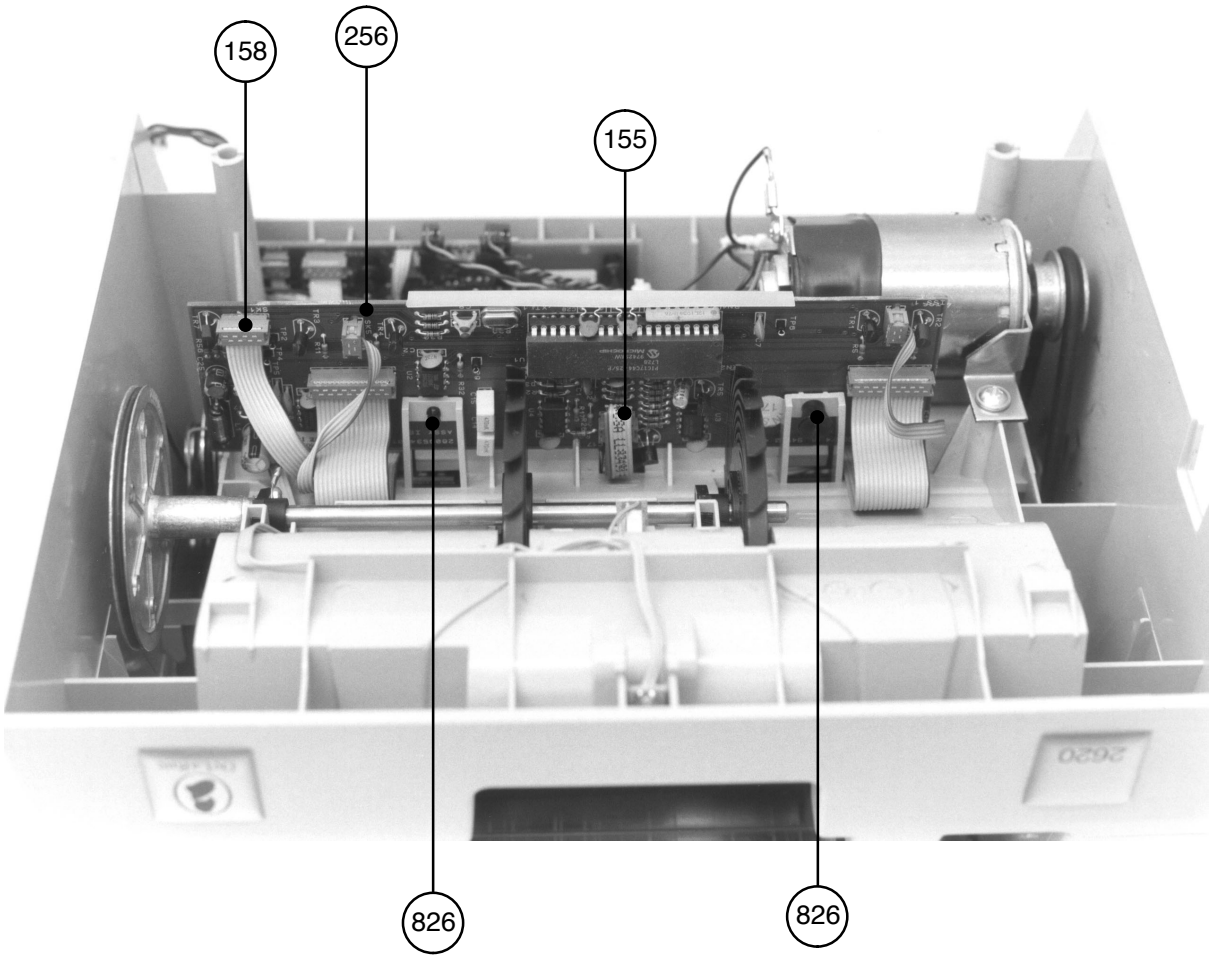


Figure 1. SD Detector – sheet 2

Note: Note Guide shown is that fitted on a 3D machine.

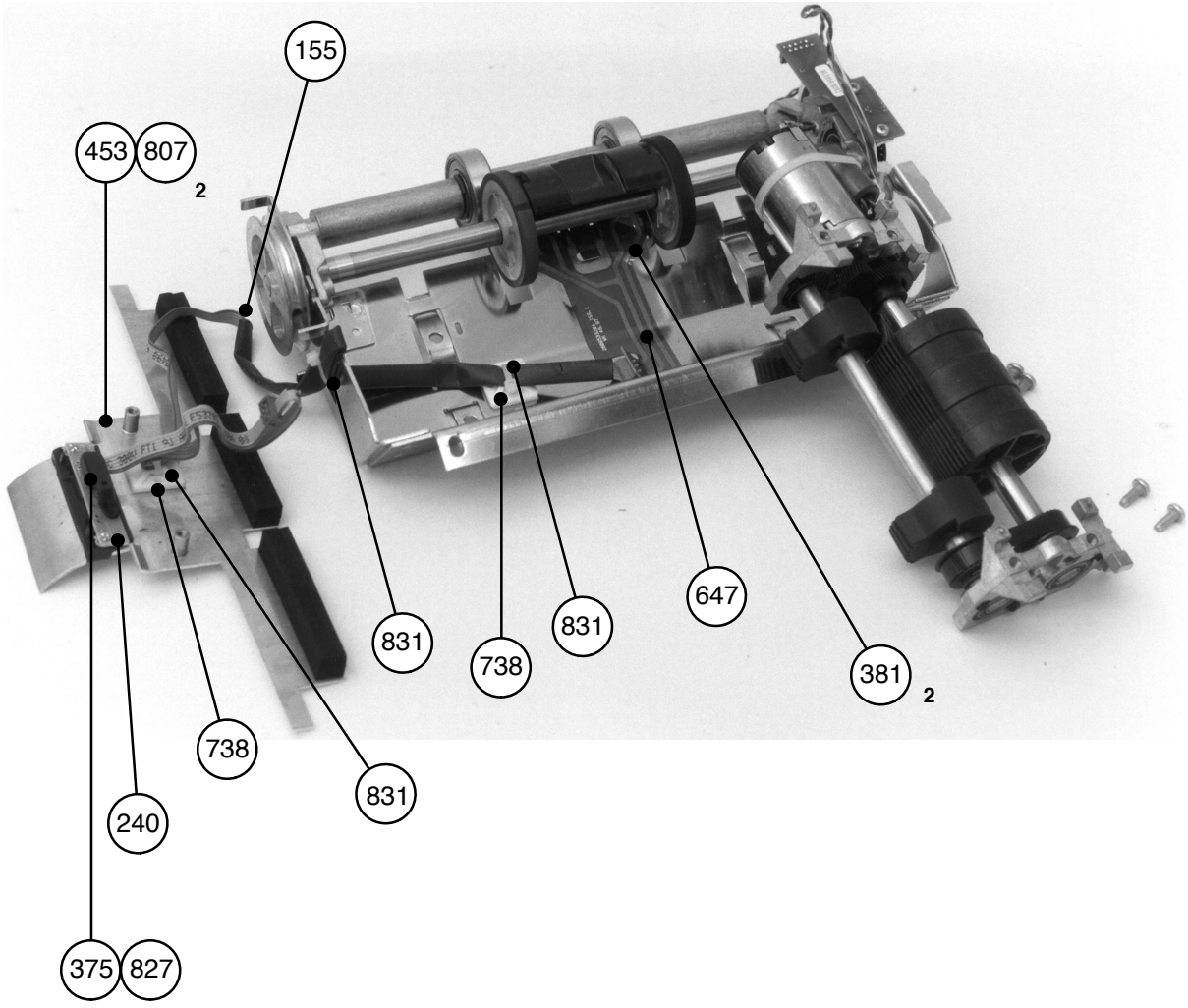


Figure 1. SD Detector – sheet 3

ITEM	DESCRIPTION	PART No.
155	Cableform SD (Finished)	2606003502
158	Cblfm Size Controller	2606002001
240	PCBP SD Detector	2609531305
256	2620 V2 Size Detector Kit	2604534602
615	Motor Control PCB Kit B8	2604534002
647	PCBP SD Flexible	2609533206

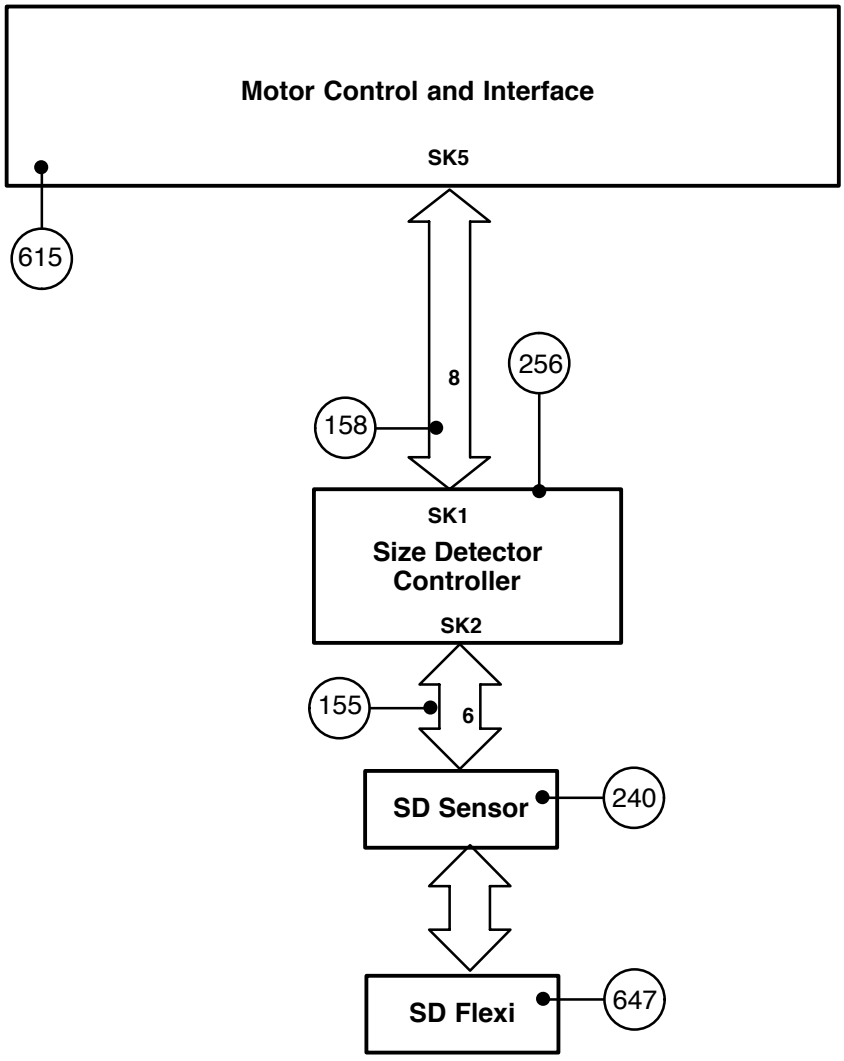


Figure 2. SD Interconnection Diagram

Appendix 10

Size Detector 3D
(non Euro machines)

CONTENTS

1.	INTRODUCTION	3
2.	OPERATION	3
3.	REMOVAL AND REPLACEMENT	3

Illustrations

Figure 1	3D Detector (4 sheets)	5
Figure 2	3D Interconnection Diagram	9

1. INTRODUCTION

This detector performs as the SD detector in Appendix 7 but includes the measurement/evaluation of the short and long edge dimensions. This option improves the machines ability to identify the note value where the short edge dimension alone is not enough to differentiate between denominations.

2. OPERATION

The 3D detector option includes the SD option described in Appendix 7 and adds a detector to measure the long edge dimension of passing documents.

The detector measuring the long edge dimension consists of a pair of illumination and sensor arrays mounted outboard of the drive rollers, on either side of the note path. Each of the illumination arrays consists of a housing containing a PCB, on which are mounted 15 LED's, providing an even level of illumination to the sensors. Each sensor consists of a 64 element photodiode array with scanning electronics to determine those elements exposed to the illumination and those shaded by the passing document. The data from the sensors is transmitted to the size controller which processes the information to decide the size of the note and, possibly, its denomination.

Operation of this detector is as SD, in terms of rogue note indication and the selection of the 3D facility.

The electrical interconnections between the 3D detector and the rest of the machine are shown in Figure 2.

The supervisor and engineer diagnostic functions for 3D are detailed in Appendix 2 of this manual.

Maintenance required includes the cleaning of the emitter and sensor devices fitted to the SD Detector PCB (item 240), and the glass faces of the length detector illumination and sensor housings (use cleaning swab – part number 02340279).

If any of the detector components are replaced, the machine must be recalibrated in accordance with Appendix 2 of this manual.

The mechanical and electrical items specific to 3D (including the SD components as mentioned above) are shown in the Key to Figure 1.

3. REMOVAL AND REPLACEMENT

The SD elements of this detector are removed and replaced as described in the SD section (Appendix 7) of this manual.

The 3D control PCB is clipped into the stacker hopper.

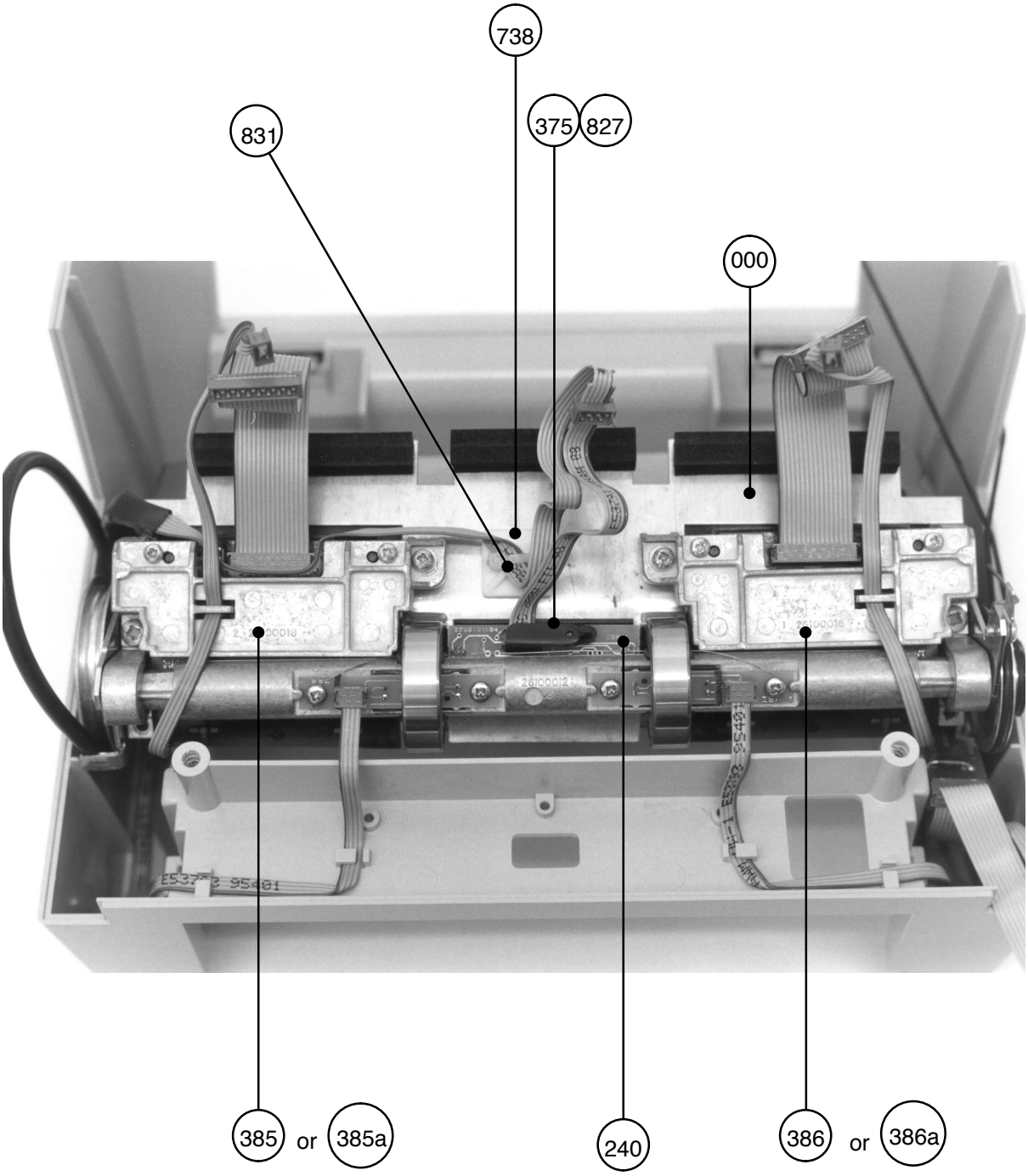
To remove the 3D sensor assemblies remove the stacker hopper and undo the two M3 screws holding the innermost parts of the 3D assemblies to the internal noteguide. The guide can now be removed.

Undo the screws holding the assemblies to the transport bearing housings and remove the sensors. Note that these sensors should not be dismantled any further.

To replace the 3D detector reverse the above procedure. Care should be taken when refitting the sensor assembly to the internal noteguide not to create a burr on the head of the 'Torx' screw as it is in the note path and could cause damage to the notes.

KEY TO FIGURE 1

ITEM	DESCRIPTION	PART NO	QTY
000	3D INTERNAL NOTE GUIDE D/A	2602307701	1
57	3D SENSOR ASSEMBLY (non EMG)	2602027701	2
57a	3D SENSOR ASSEMBLY EMG – LH	2602027801	1
57b	3D SENSOR ASSEMBLY EMG – RH	2602027901	1
59	3D ILLUMINATION ASSY LH	2602004602	1
78	3D ILLUMINATION ASSY RH	2602007502	1
155	CBLFM. SD (FINISHED)	2606003502	1
156	CBLFM 3D SENSOR	2606001801	2
158	CBLFM. SIZE CONTROLLER	2606002001	1
240	PCBP SD DETECTOR SENSOR	2609531305	1
256	2620 V2 SIZE DETECTOR KIT	2604534602	1
263	SHIELD, SD, PCB, D/A	2602013302	1
283	BRACKET 3D SENSOR R/H	S1–2610001602	1
284	BRACKET 3D SENSOR L/H	S1–2610001802	1
375	CLAMP, SD DETECTOR PCB	2614006401	1
385	3D DETECTOR ASSEMBLY LH (non EMG)	2602028101	1
385a	3D DETECTOR ASSEMBLY EMG LH	2602028301	1
386	3D DETECTOR ASSEMBLY RH (non EMG)	2602028201	1
386a	3D DETECTOR ASSEMBLY EMG RH	2602028401	1
627	MTG 3D DETECTOR R/H M/CD B8	2610001503	1
628	MTG 3D DETECTOR L/H M/CD B8	2610001703	1
647	PCBP SD FLEXIBLE	2609533206	1
738	CLIP CBL SAD NYN 19 x 19 BASE	01002882	3
810	SCREW S260006	02460416	6
826	STAND OFF RHICHO SRT–3555B	02460406	2
827	SCREW STAP K30 x 12 TORX CSK	02460588	1
831	TYWRAP 92/102LG	00470401	5
942	SCREW STAP M3 x 12 PAN POZI	00462919	2



EMG variants are 385a & 386a
(not illustrated)

Figure 1. 3D Detector – sheet 1

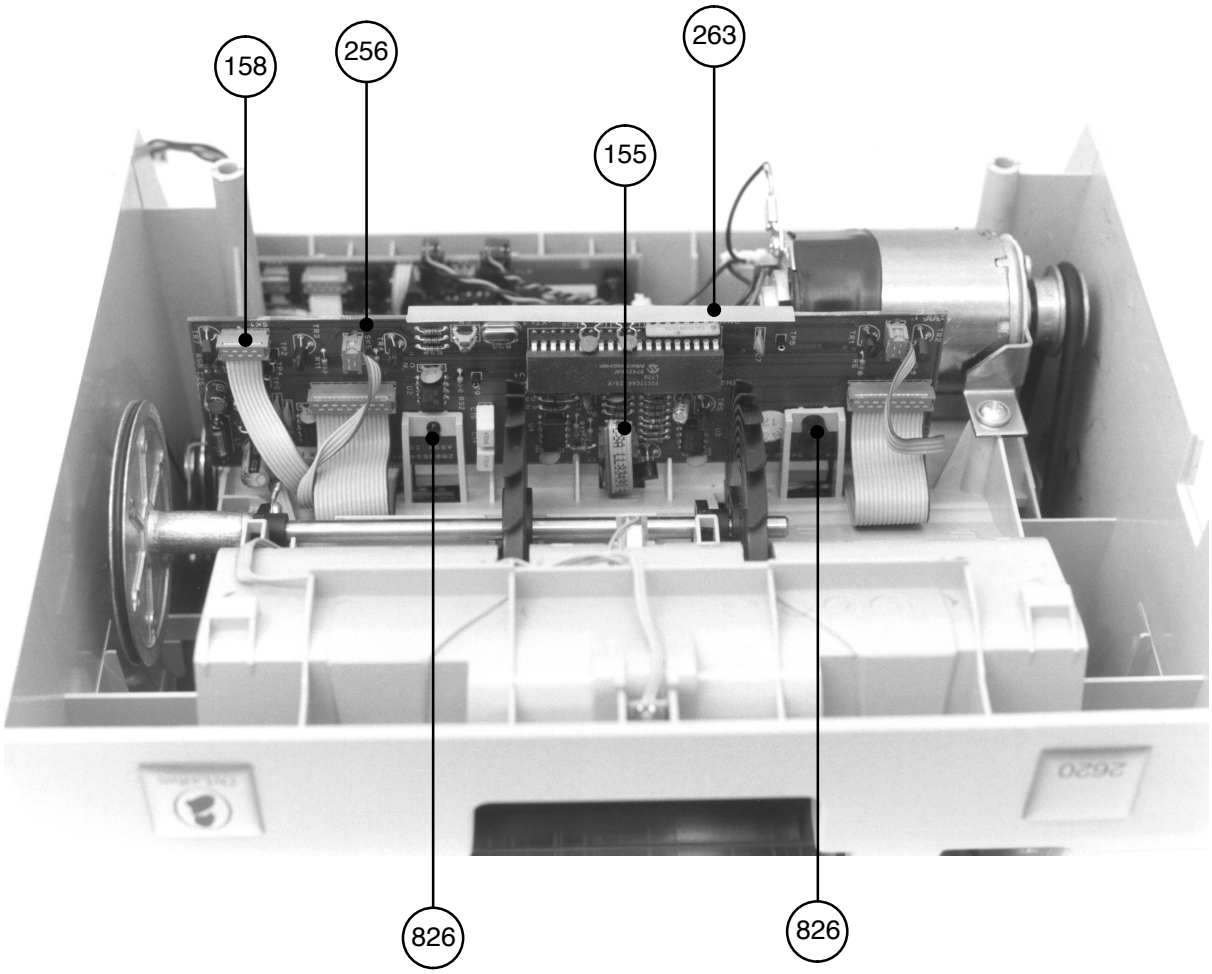


Figure 1. 3D Detector – sheet 2

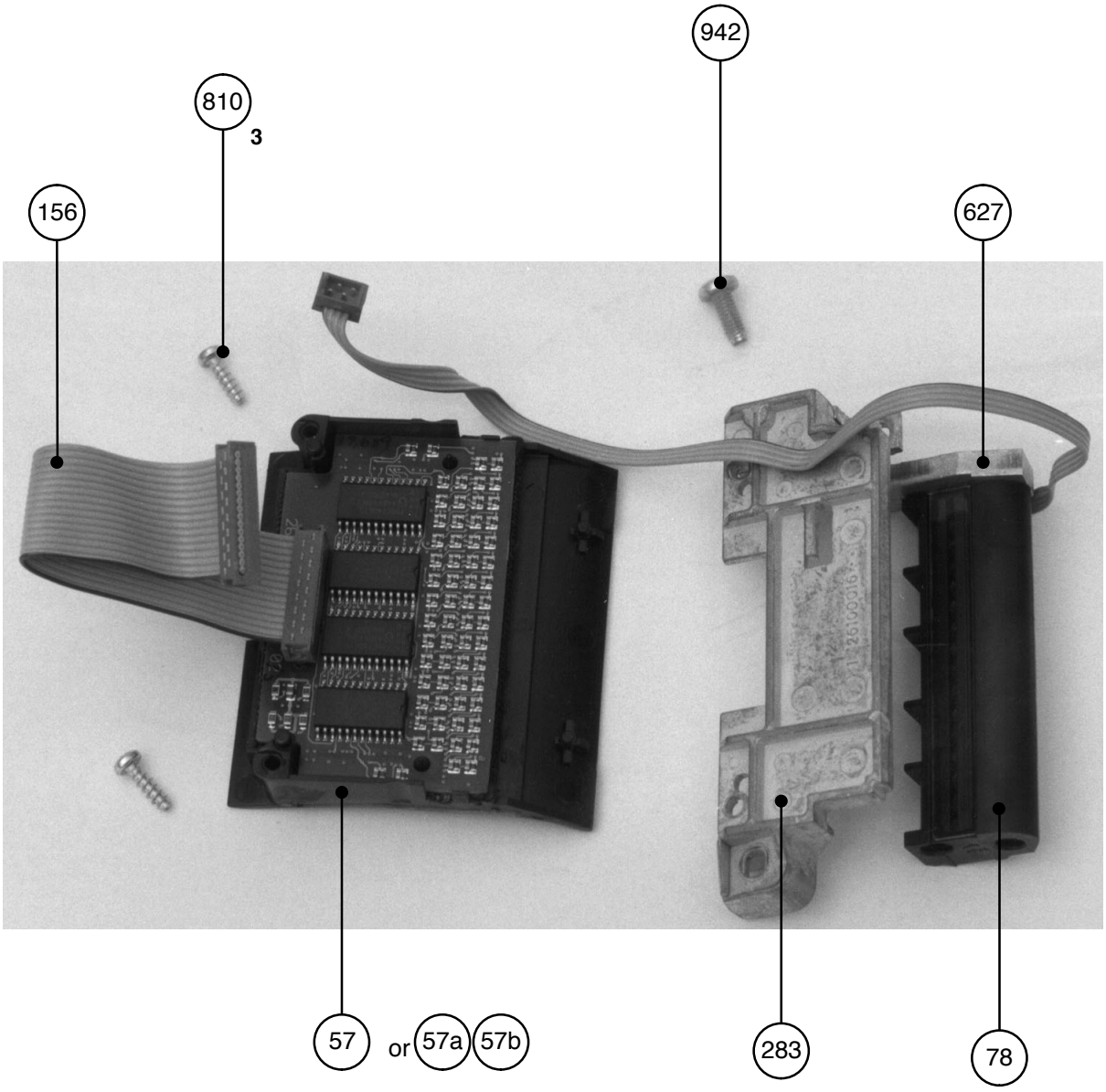


Figure 1. 3D Detector – sheet 3

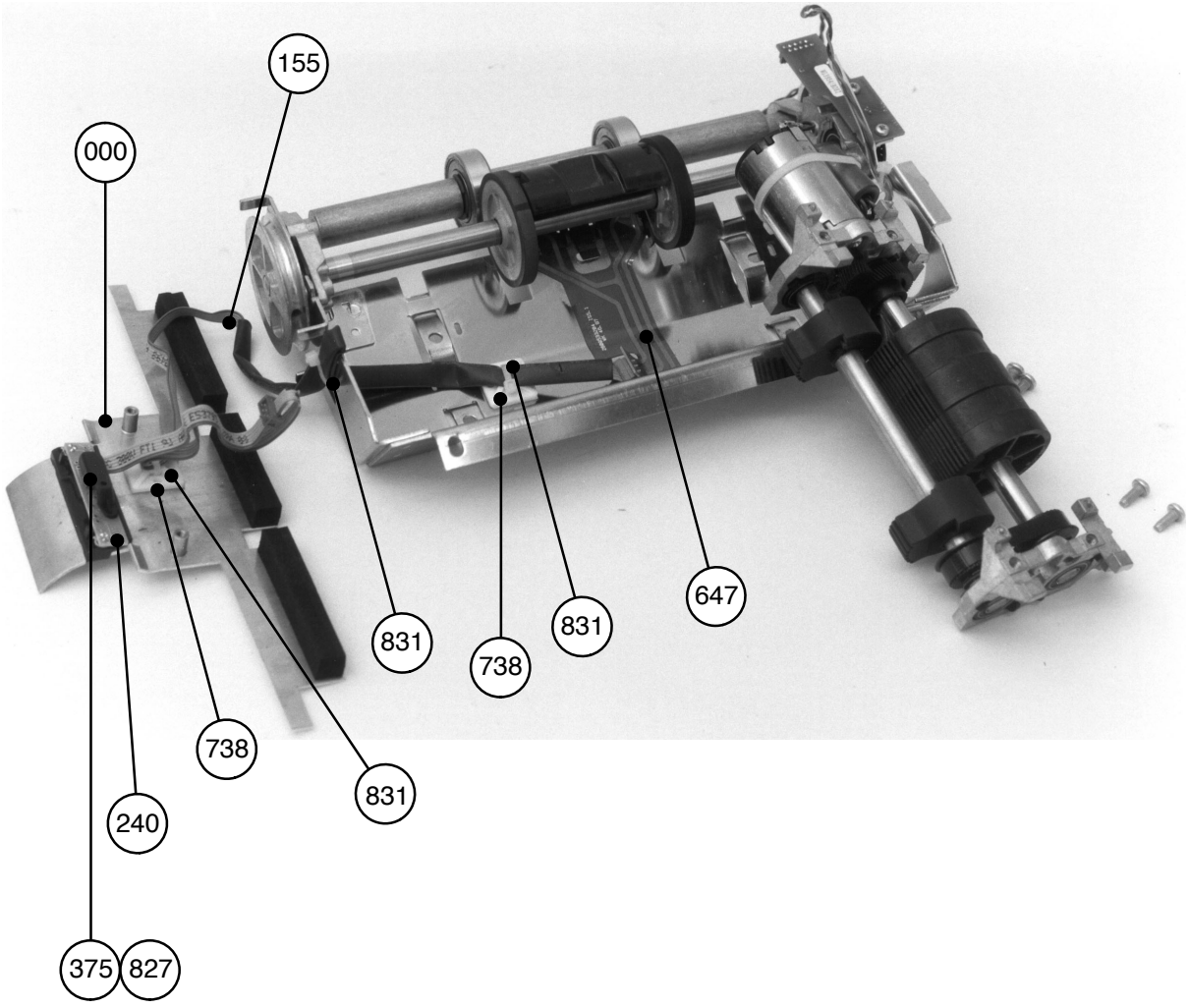


Figure 1. 3D Detector – sheet 4

ITEM	DESCRIPTION	PART No.
57	3D Sensor Assembly	2602307701
59	3D Illumination Assy LH	2602004602
78	3D Illumination Assy RH	2602007502
155	Cableform SD (Finished)	2606003502
156	3D Sensor Cableform	2606001801
158	Cblfm Size Controller	2606002001
240	PCBP SD Detector	2609531305
256	2620 V2 Size Detector Kit	2604534602
615	Motor Control PCB Kit B8	2604534002
647	PCBP SD Flexible	2609533206

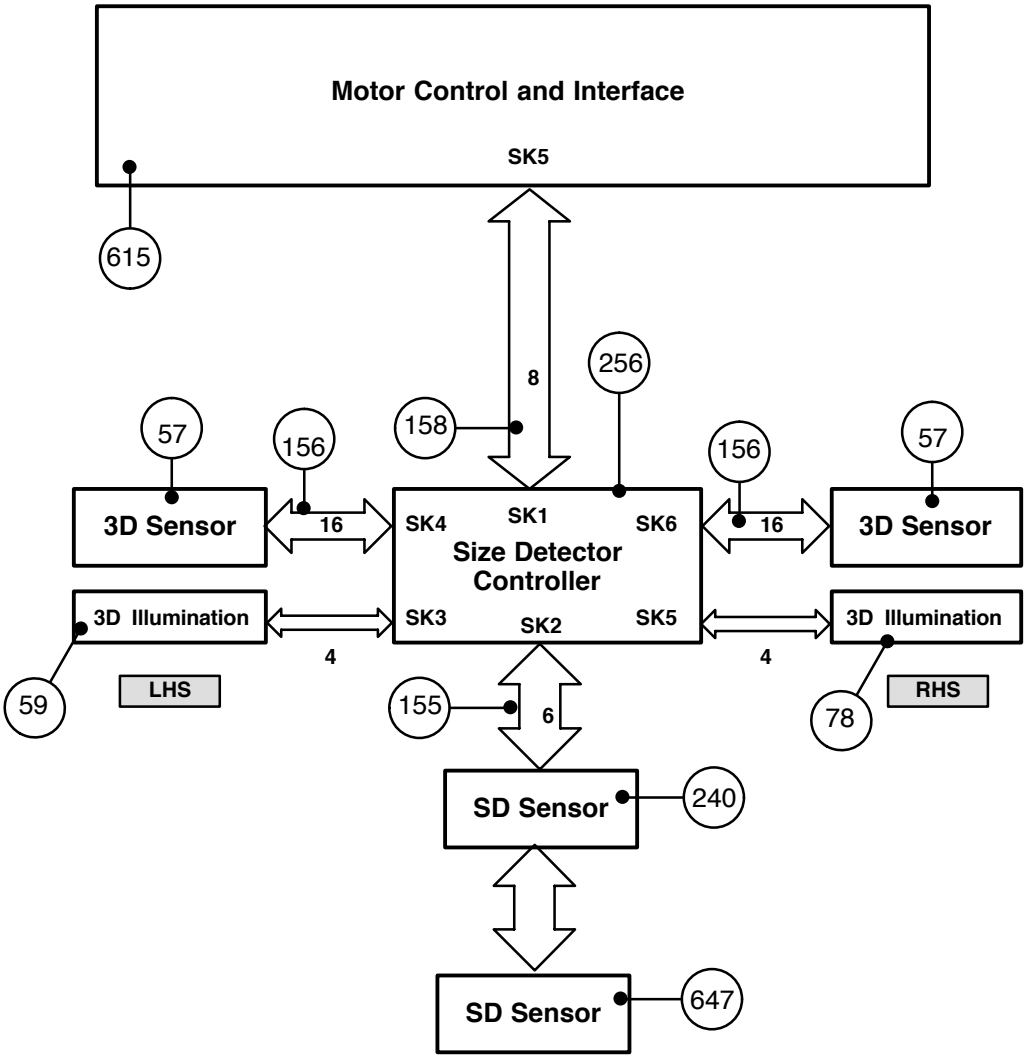


Figure 2. 3DInterconnection Diagram

Appendix 11

Ultra Violet Detector
(non Euro machines)

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2.	OPERATION	3
3.	REMOVAL AND REPLACEMENT	3

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Figure 2	UV Interconnection Diagram	6

1. INTRODUCTION

The Ultra Violet detector provides a method of determining whether the base paper of a banknote is UV Bright, or not. It should be noted that the UV Bright option is not a complete counterfeit detection device as it detects only the UV brightness of the banknotes.

2. OPERATION

The UV detector uses an ultra–violet light source to illuminate a section of the document as it passes through the transport. A UV sensor measures the level of UV fluorescence emanating from the document and compares this with a threshold value to determine whether the document is UV 'dull' (likely to be genuine) or UV 'bright' (likely to be counterfeit).

The threshold for this detector may be adjusted in accordance with Appendix 2 paragraph 7 of this manual (Supervisor function mode 3).

A reference sensor is used to measure the light output from the UV light source and the electronics compensates for variations that might occur.

If the machine detects a UV rogue document in normal operation it will stop and display a 'CF X' error (as described in Appendix 13 paragraph 1.3), and the UV icon on the display will flash.

Operation of this detector is selected or de–selected using the 'CFA' key.

The electrical connections between the UV detector and the rest of the machine are shown in Figure 2.

The supervisor and engineer diagnostic functions for UV are detailed in Appendix 2 of this manual.

No maintenance is required for this detector other than ensuring that the front surface of the UV holder glass is clean.

If any of the detector components are replaced, the machine must be recalibrated in accordance with Appendix 2.

The mechanical and electrical items specific to UV are detailed in the parts list at the end of this section.

3. REMOVAL AND REPLACEMENT

WARNING

THE UV CONTROL PCB ON 26XX MACHINES CAN REMAIN HOT FOR SOME MINUTES AFTER SWITCHING OFF.

The UV detector is clipped into the detector box base and is removed by carefully pulling back the clip and rotating the detector body away from the clip.

To remove the bulb and sensor from the sensor body, rotate the caps. Note the position of the static bonding wire for reassembly.

Remove the screw securing the UV Control PCB to the inside rear of the detector box lid and remove the PCB.

To replace the UV detector reverse the above procedure. Check that the sensor and bulb are fitted the correct way round. The pips on the caps must line up with the pips on the sensor body. Ensure that the 'tongue and groove' location feature on the UV body is correctly located before rotating downwards to clip into place.

KEY TO FIGURE 1 (for 2610 & 2650)

ITEM	DESCRIPTION	PART NO	QTY
000	SCREW STAP PAN POZI PLASTIC	02460522	1
154	CABLEFORM DETECTOR BOX	2606001601	1
175	UV PCB KIT 2600 – 2620	2604533103	1
519	UV SENSOR CARRIER	2614009902	1
521	2600 UV PHOTO SENSOR CBLFM	2606004402	1
523	2600 UV BULB CABLEFORM	2606004503	1
524	2600 UV REF SENSOR CBLFM	2606004602	1
553	UV DETECTOR ASSEMBLY – see note	2602302104	1
649	CBLFM – UV EARTH B8	2606301003	1

Note: Item 553 includes items 519, 521, 523, 524 and 649.

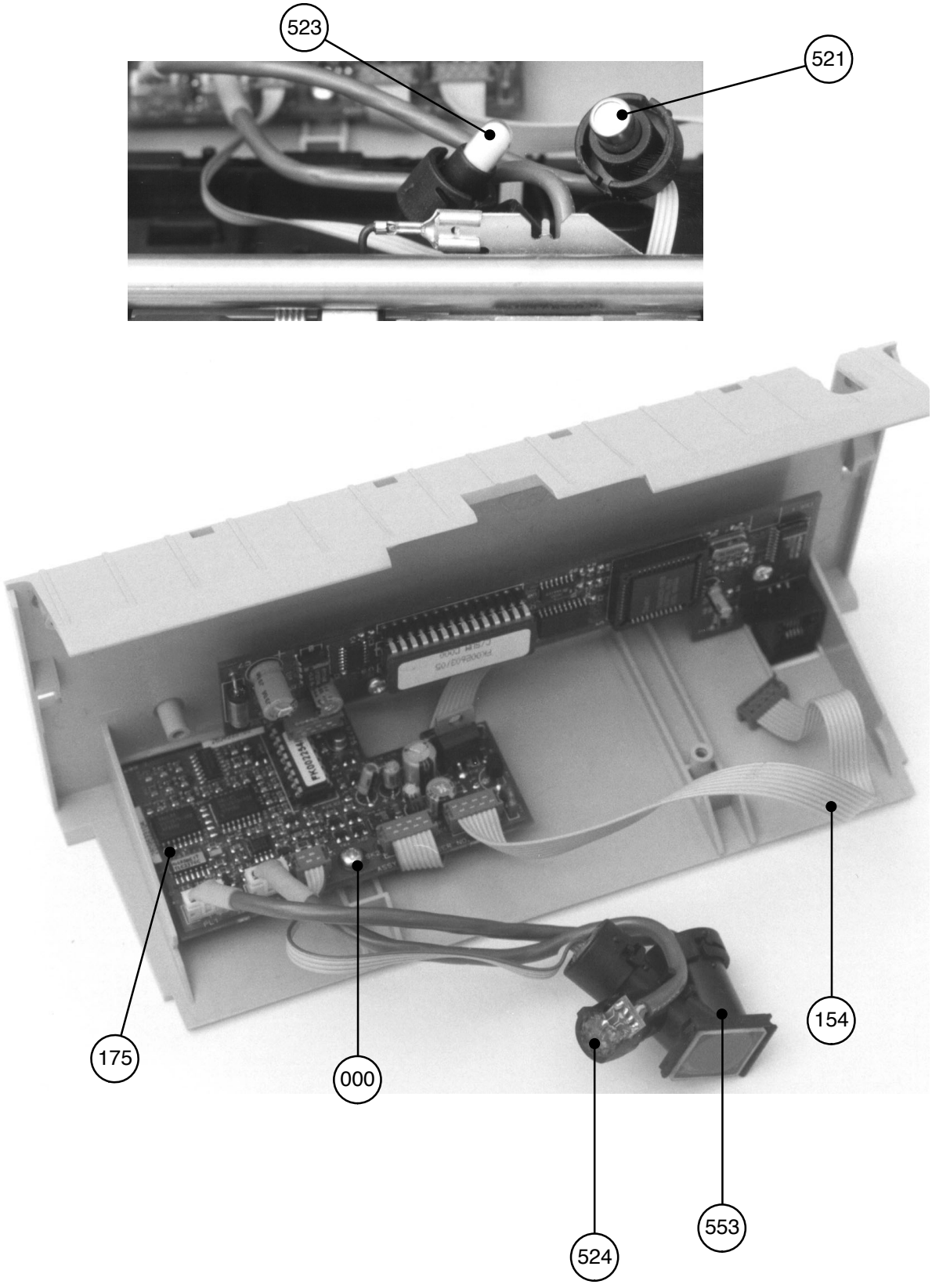

Figure 1. UV Detector

ITEM	DESCRIPTION	PART No.
154	Cableform Detector Box	2606001601
175	UV PCB Kit	2604533103
521	2600 UV Photo Sensor Cableform	2606004402
523	2600 UV Bulb Cableform	2606004503
524	2600 UV Ref Sensor Cableform	2606004602
553	UV Detector Assembly	2602302104
615	Motor Control PCB Kit B8	2604534002

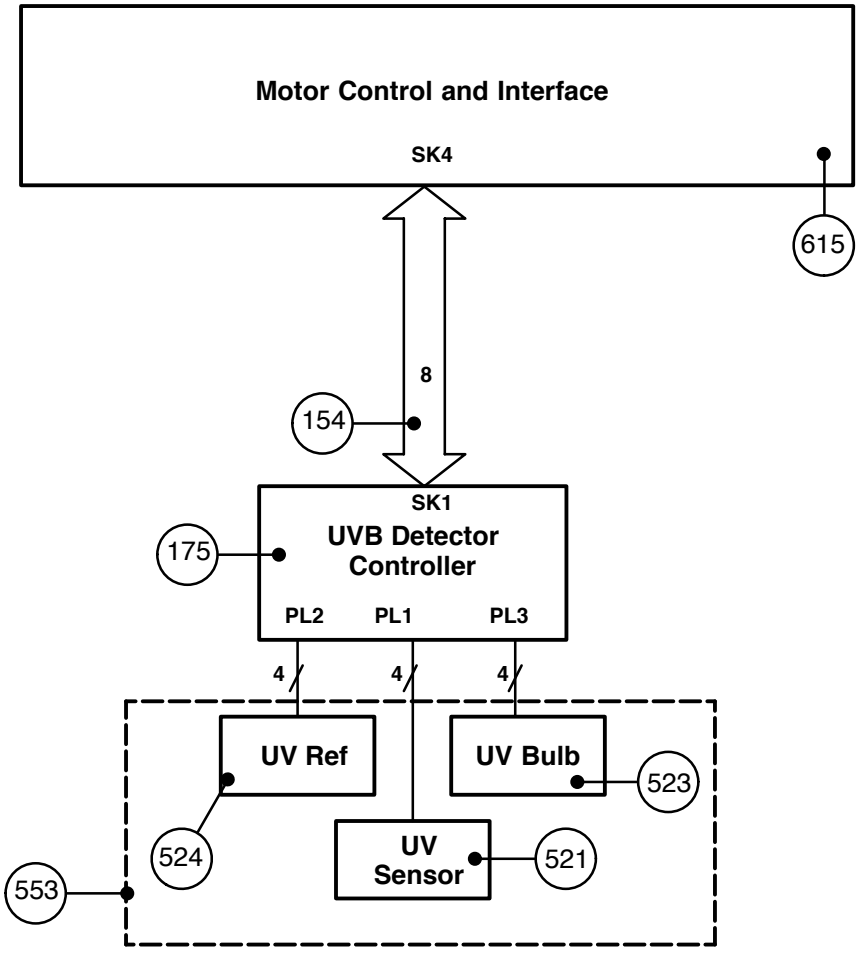

Figure 2. UV Interconnection Diagram

Appendix 12

Enhanced Magnetic Presence Detector (EMG) (non Euro machines)

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2.2	Replacement	3

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1. INTRODUCTION

The Enhanced Magnetic Presence detector (EMG) provides a method of determining if a banknote has any magnetic ink in its central portion. For operation of the EMG detector refer to the User Guide.

2. REMOVAL AND REPLACEMENT

2.1 Removal

To remove the EMG detector proceed as follows:

a. Remove the detector box lid and base.

b. Undo the three clamp screws which secure the detector to the feed hopper and carefully remove the detector unit.

Note: The PCB is attached to the detector unit and must be fed through its retaining slots.

c. To remove the guide and spring unclip and remove the central support upper. Note the location of the spring to aid replacement.

2.2 Replacement

To replace the EMG detector proceed as follows:

a. The guide arm replacement is the reverse of the removal procedure.

b. When refitting the magnetic head into the housing ensure that the head locates on the two pips in the moulding. Check that the insulation tape on the bottom of the head is attached and in good condition.

c. Check that the EMG detector and IBUS cables are connected.

d. Slide the detector assembly into position, fit the bushes and loosely refit the 3 clamp screws and washers.

e. Set the Mag Head holder (item 12, figure 1) parallel to and 16mm away from the inner rear face of the feed hopper.

KEY TO FIGURE 1			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
1	NOTEGUIDE EMG D/A	2602307202	1
2	MAG HEAD	2620008301	1
3	CBLFM – EMG ISB	2606005301	1
4	WASHER M6 FORMA MS ZCEP	00460307	3
5	WASHER M3 SPECIAL	3216168101	3
6	SCREW STAP PAN POZI PLASTIC	02460522	3
8	EMG FEED BEARING HOUSING MACHINED	2620016601	1
9	SHIELD – FEED MOTOR	2620011601	1
10	FEED MOTOR (MAG) SPARES ASSY (includes items 8 and 9)	2603003501	1
11	CLAMP PLATE	2616002402	1
12	MAGHEAD HOLDER (non 3D)	2614009503	1
	MAGHEAD HOLDER (3D)	2620015801	1
–	EMG CENTRAL ARM SPRING (NOT SHOWN)	2643001101	1
–	EMG PCB KIT (NOT SHOWN)	2604536001	1

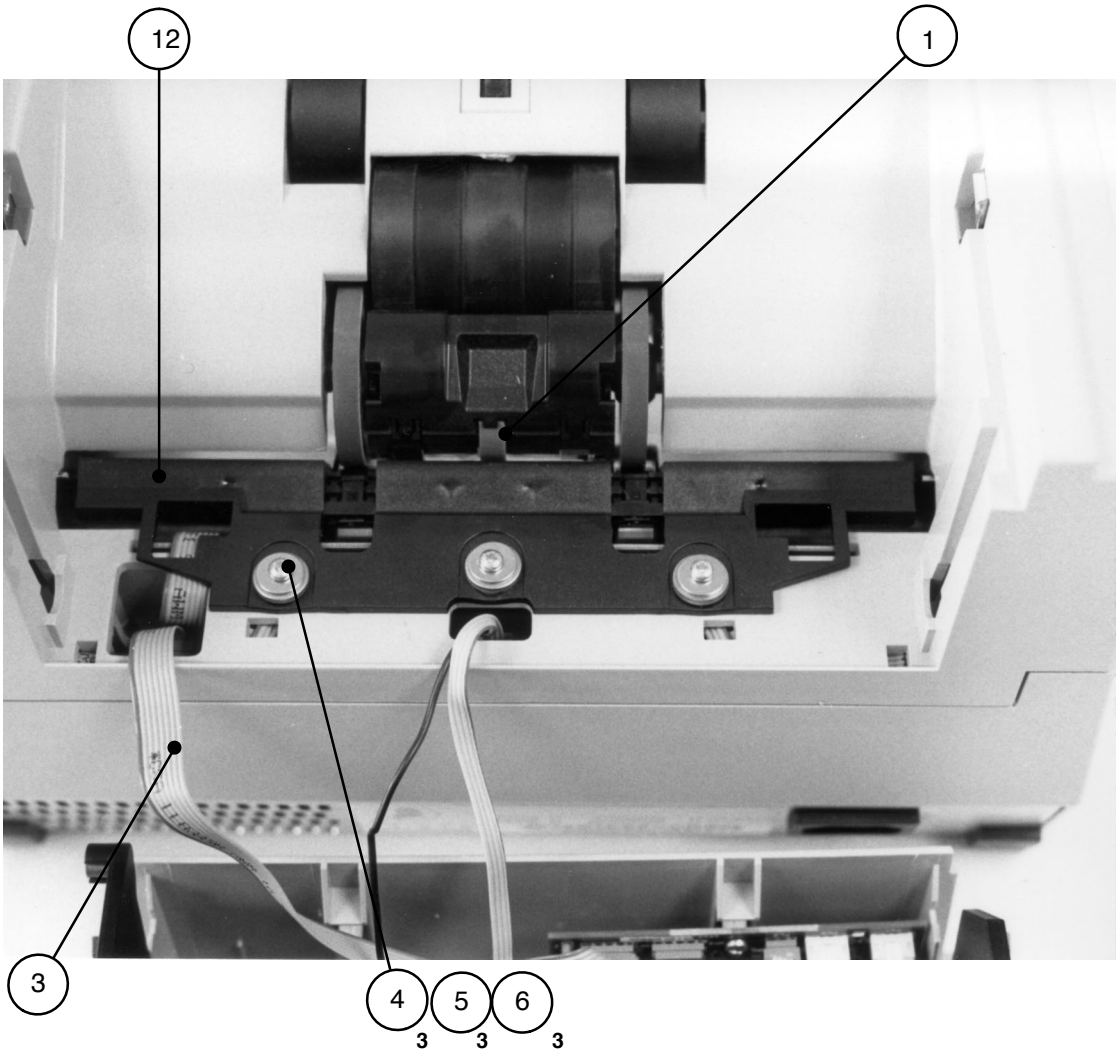

Figure 1. EMG Detector – sheet 1

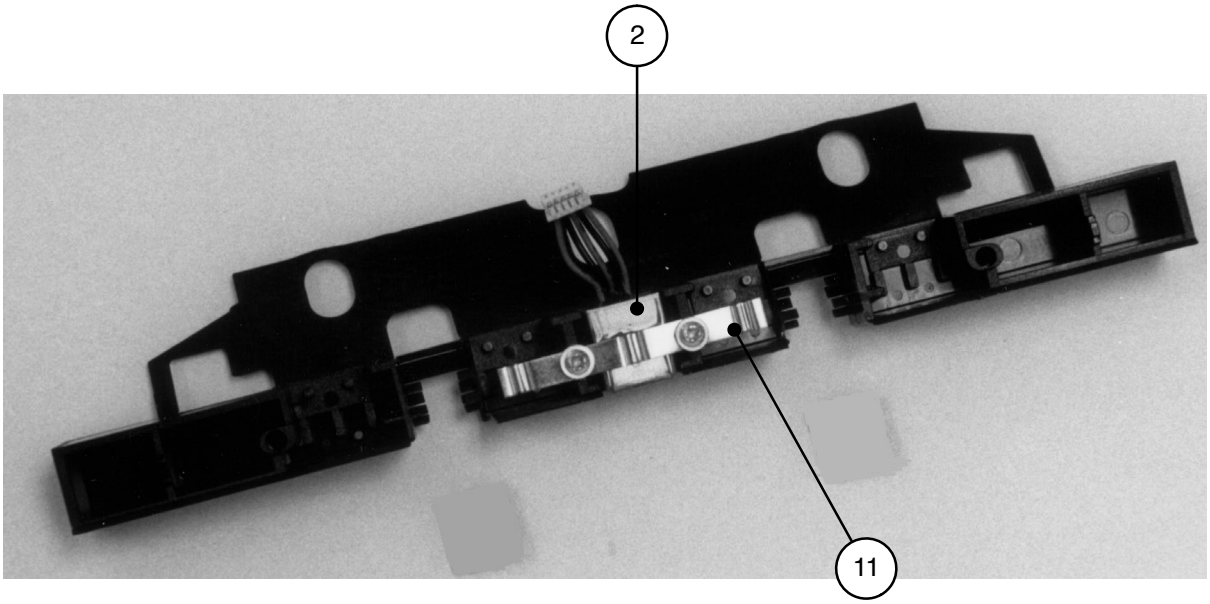

Figure 1. EMG Detector – sheet 2

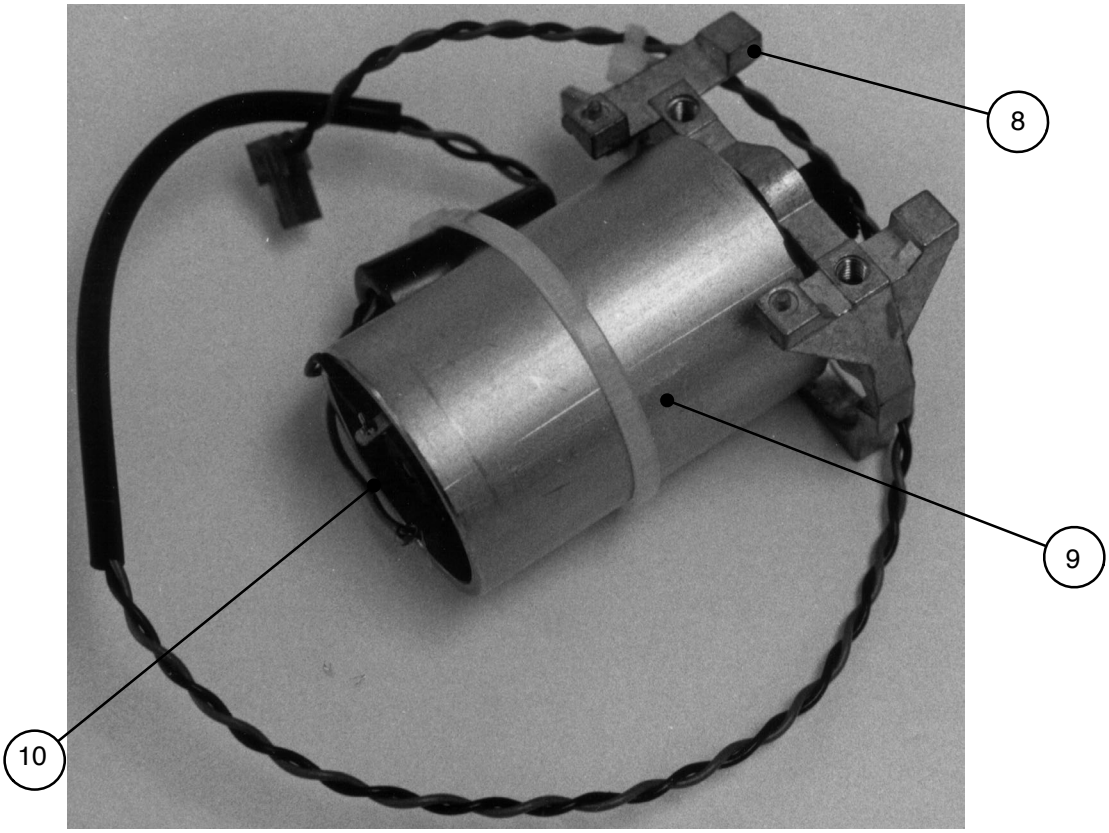

Figure 1. EMG Detector – sheet 3

Appendix 13

Cash Management System, CMS
(2650 non Euro machines)

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1. INTRODUCTION

The CMS (Cash Management System) option provides a method of communicating with the 26xx using an external device, eg. a PC or host computer. Normally this option is provided on a machine to form part of a Cash Management System where the machine uploads information on the number of notes counted, or their value, to the host computer for central logging of machine counting activity.

2. CMS INTERFACE

The CMS interface uses a microcontroller PCB to enable the transmission and reception of data and commands over a serial connection on the rear of the machine.

Different protocol implementations are available suiting a variety of applications, refer to De La Rue Systems for further details.

The supervisor and engineer diagnostic functions for CMS are detailed in Appendix 2 of this manual.

No maintenance is required for this option.

KEY TO FIGURE 1			
ITEM	**DESCRIPTION**	**PART NO**	**QTY**
154	CABLEFORM DETECTOR BOX	2606001601	1
255	CMS V2 CONTROLLER PCB KIT	2604534704	1
825	SCREW STAP PAN POZI PLASTIC	02460522	2
–	CABLE, 2620 CMS COMMS 9 WAY	2606004004	1

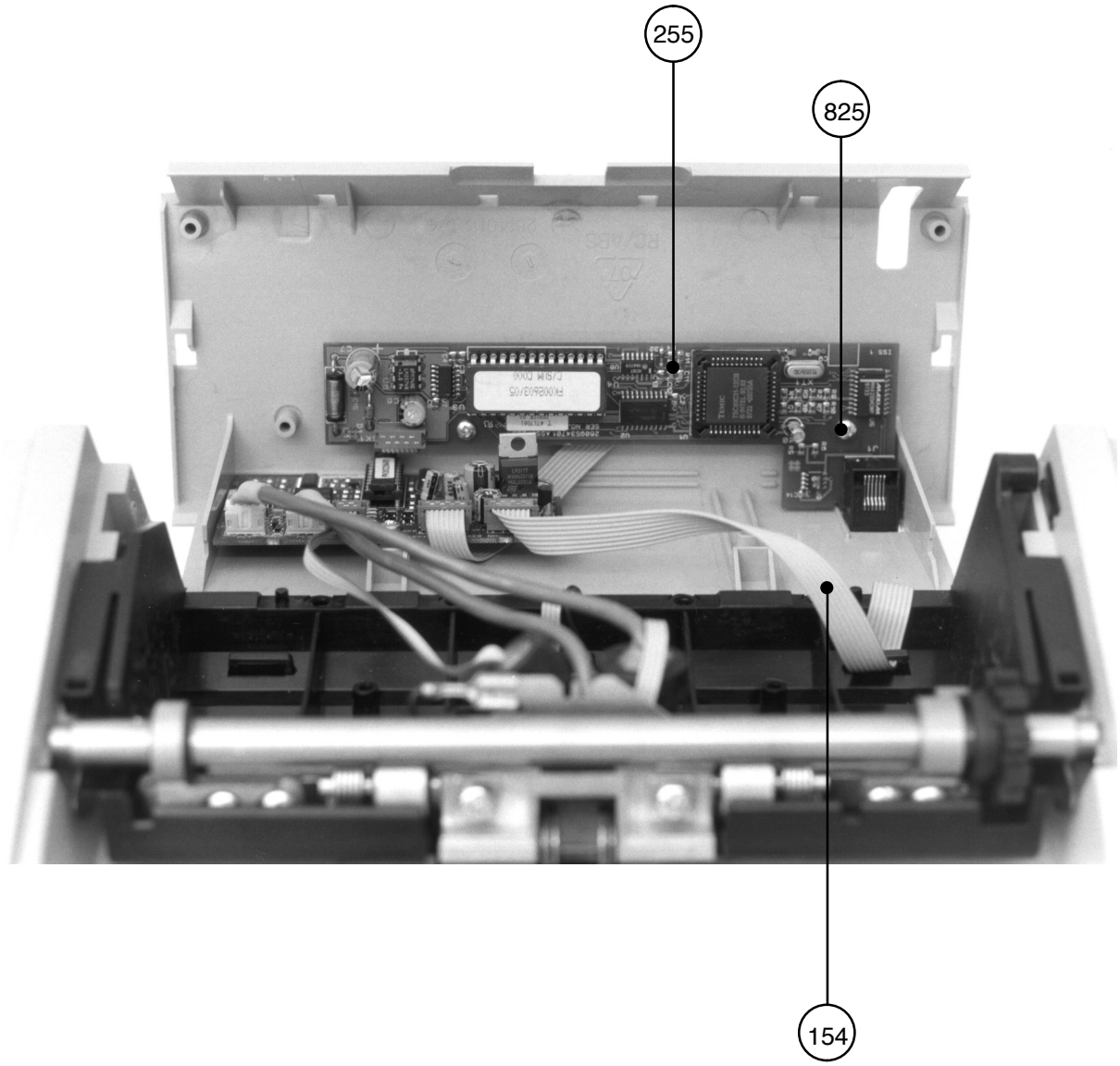

Figure 1. CMS Interface Detector Box Assembly

ITEM	DESCRIPTION	PART No.
154	Cableform Detector Box	2606001601
255	CMS V2 Controller PCB	2604534704
615	Motor Control PCB Kit B8	2604534002

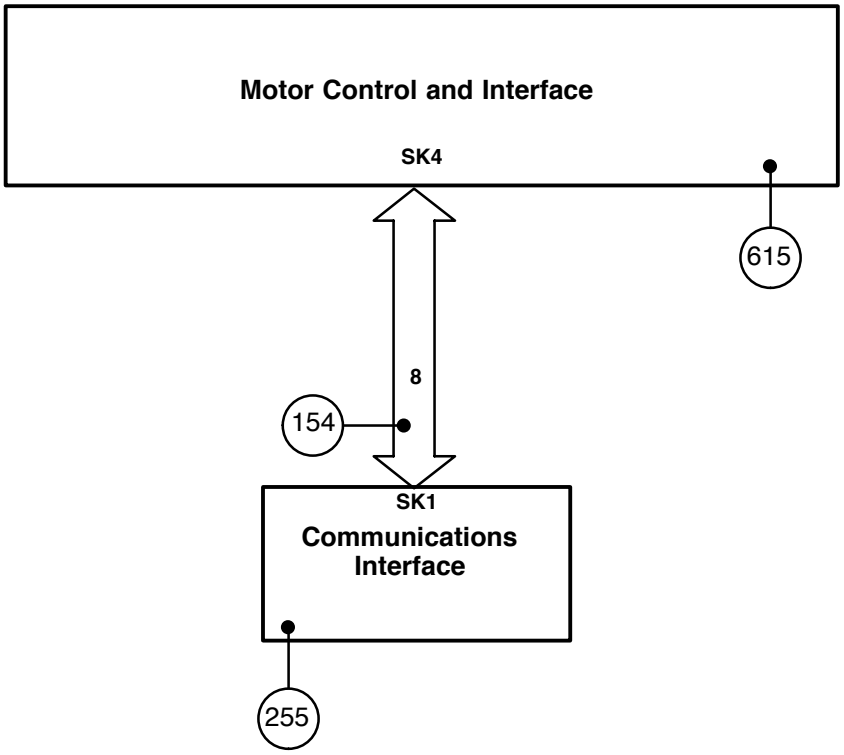

Figure 2. CMS Interconnection Diagram

Appendix 14

Value Operation

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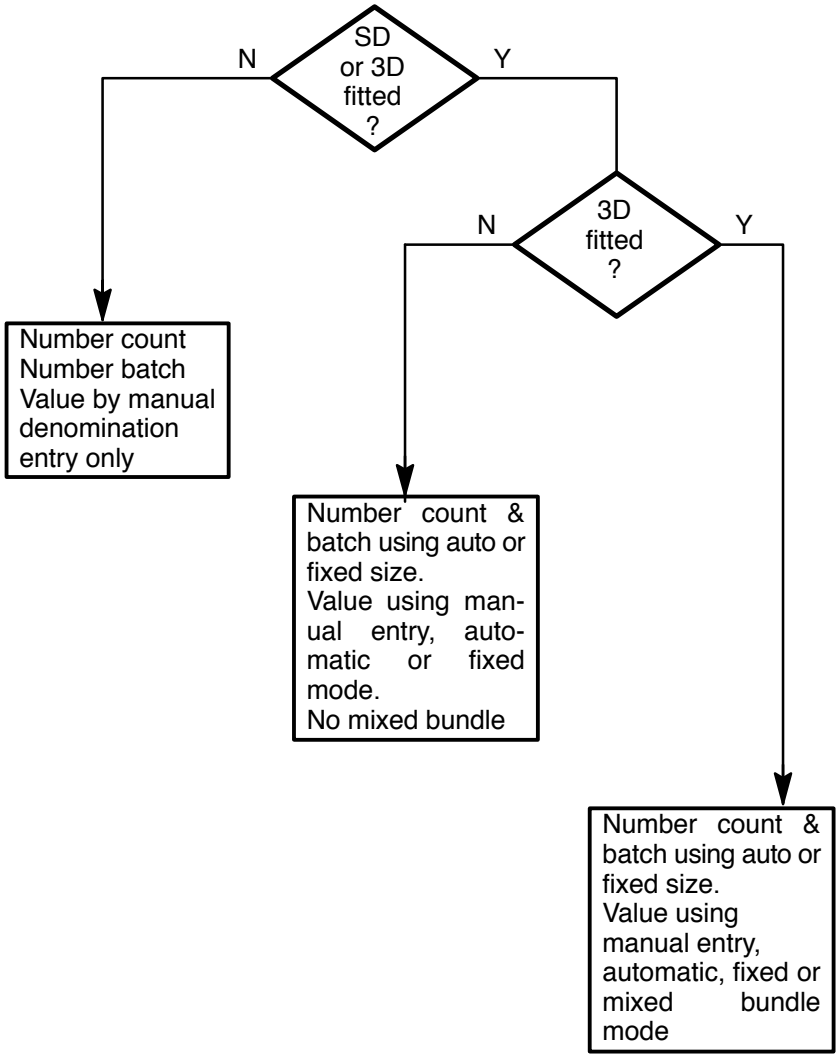
1. INTRODUCTION

Value operation enables the machine to count and dispense by value, rather than number, of notes. Counting/dispensing can be manual or automatic depending on machine programming and detectors fitted. A printout of results may be obtained on those machines configured with the optional interface connection.

2. SIZE/VALUE OPERATING MODES

The following descriptions identify the various modes of machine operation, depending on the detector options that may be fitted.


SD or 3D fitted ?
N
Y
3D fitted ?
N
Y
Number count
Number batch
Value by manual denomination entry only
Number count & batch using auto or fixed size.
Value using manual entry, automatic or fixed mode.
No mixed bundle
Number count & batch using auto or fixed size.
Value using manual entry, automatic, fixed or mixed bundle mode

2.1 Size Operating Modes

Auto Size ('Auto' – Default setting)
In this operating mode the machine measures the size of the first note in a bundle and uses this data as a reference, against which all other notes, of that bundle, are checked. The machine will stop on rogue notes if the dimensions are outside this 'first note reference' +/– the size limits set in diagnostics 3 and 4 (SD short edge), 23 and 24 (3D long edge).

In this mode the measurements are all 'relative' to the first note, and are independent of the actual size of that particular denomination of notes.

2.2 Value Operating Modes

Manual Denomination Identification ('dEntr')
If note denominations are not identifiable by being of sufficiently different sizes, or a machine is not fitted with a size detector, the user may manually enter the denomination on the machines keypad. In this mode, the machine is not able to verify the note denomination, nor can it ensure that all the notes in the bundle are of the same denomination (because there is no size detection).

Automatic Denomination Identification ('AdEno')
This mode may be used only where a size detector is fitted and where the sizes of the different denominations being counted can be discriminated on size (short and/or long edge). The table of sizes must not have any overlaps, as the machine could not then uniquely identify a note which fitted more than one table location. In a 3D machine there may be overlaps in one, but not both, dimensions. In this mode the user is not required to enter any information on the machines keypad on the denomination or size, this is automatic. In this mode the machine automatically identifies the denomination of the first note counted and uses the size measured as a reference to verify the following notes in that bundle.

3. SIZE / DENOMINATION TABLE PROGRAMMING

Refer to diagnostic 5 in Appendix 2 for details on how to program the Size/Denomination table.

4. VALUE ASSIGNMENT BY SIZE

The machine **MUST** be calibrated before value assignment by size is possible (diagnostic 6 for SD machines or diagnostic 6 and 22 for 3D machines – refer to Appendix 2).

Note: The 2650 measurement accuracy is typically ± 0.5mm on the short dimension and ±1.0mm on the long dimension. This must be taken into consideration when programming the size tables.

The note sizes stated for currencies are nominal dimensions and are subject to cutting tolerances that are typically ± 2mm.

4.1 Determining Limits & Limitations

A programme will be available shortly from De La Rue Service which runs on an IBM PC or compatible computer. This programme should be used whenever possible to setup a value machine for a new currency as it generates a step by step set of instructions to follow given note sizes and denominations.

However the limits can be calculated manually as follows:

Select the range of notes from the currency to be recognised by the 2650. Determine the difference in mm between each note and it's neighbour. Select the minimum short edge difference (Y) and the minimum long edge difference (X) – see Figure 1.

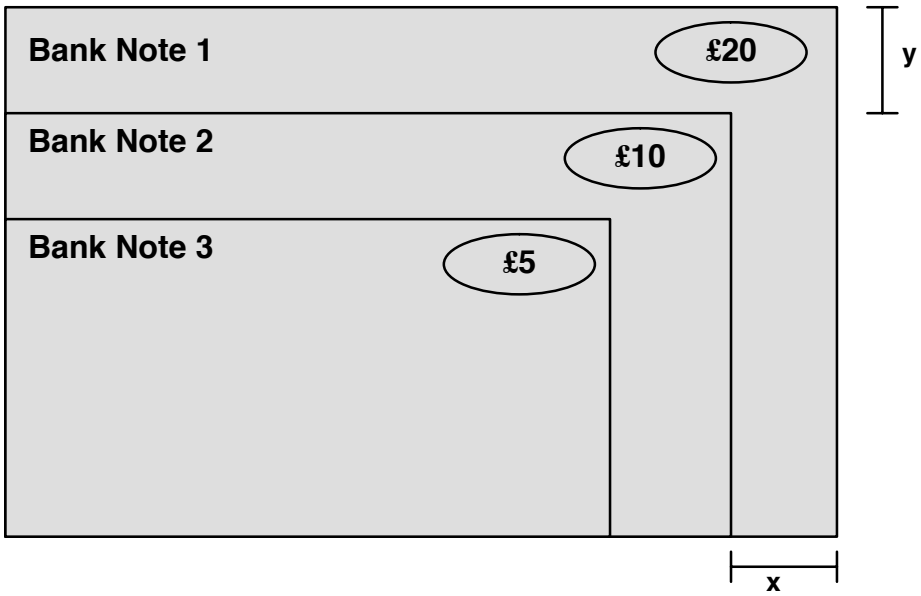


Figure 1. Determining Limits and Limitations

a. SD Machines

Dimension y must be greater than 5.0mm to separate notes with a cutting tolerance of ± 2.0mm and machine measurement accuracy of ± 0.5mm.

b. 3D Machines

Overlaps are allowed in the long edge dimension OR the short edge dimension only – but not both, between notes. This means that notes that have little or no difference in their short edge dimensions can be separated, provided that they have a sufficient difference in their long edge dimension.

- Dimension y must be greater than 5.0mm to separate notes with a cutting tolerance of ± 2.0mm and machine measurement accuracy of ± 0.5mm or
- Dimension x must be greater than 6.0mm to separate notes with a cutting tolerance of ± 2.0mm and machine measurement accuracy of ± 1.0mm.

c. Example Programming Using U.K. Currency

The dimensions of the U.K. currency notes used are as follows:

- £5 = 135mm x 70mm
- £10 = 142mm x 75mm
- £20 = 150mm x 80mm

For the currency above x = 7mm and y = 5mm.

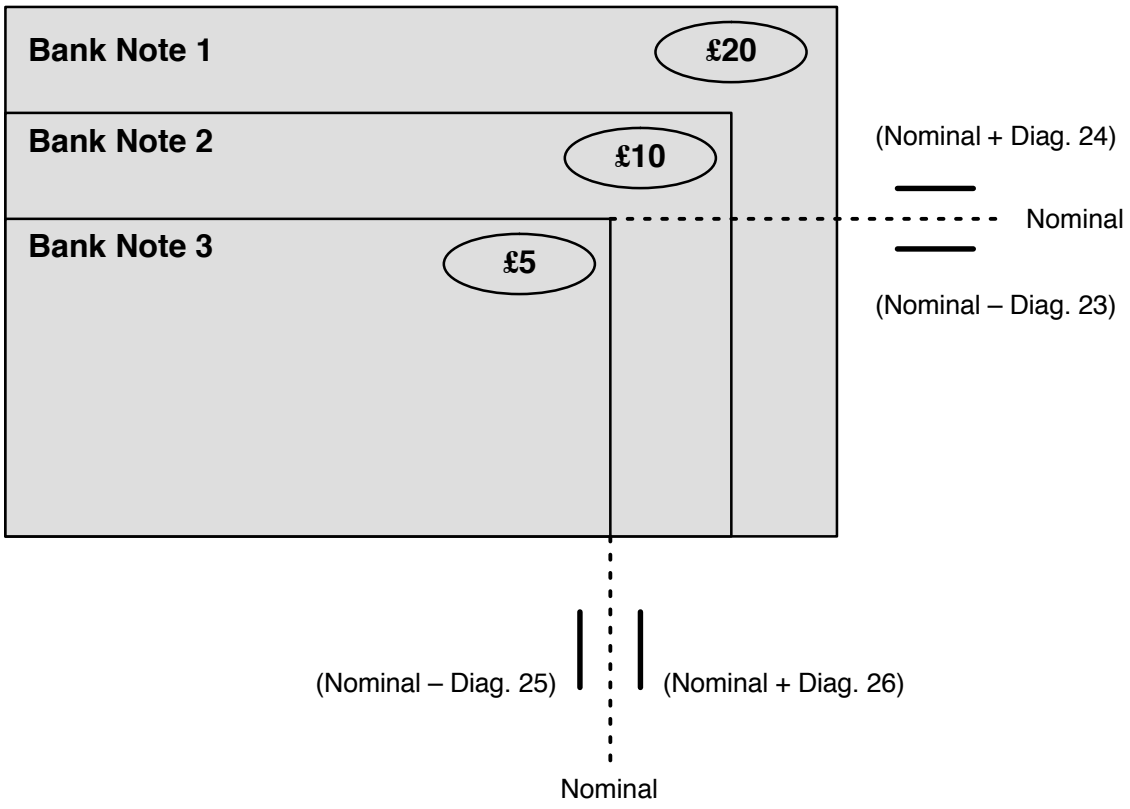


Figure 2. Example Programming Using UK Currency

Minimum difference between notes =
(measurement accuracy x 2) + (Cutting tolerance x 2)

For the short edge:

- Measurement accuracy = ± 0.5mm
- Cutting tolerance = ± 2mm

Minimum difference between notes = (0.5mm x 2) + (2mm x 2) = 5mm

If the minimum difference between notes < 5mm then it is not possible to separate notes by short edge only.

If the minimum difference between notes > 5mm then it is possible to have a deadband between notes where notes just outside the limits are not mis–assigned.

Deadband = (y – minimum difference between notes) = 0mm

Alternatively the deadband can be ignored. This helps with notes in fair to poor condition (provided that the difference between notes is > 5mm).

Note: From experiments with the U.K. currency it was found that setting the maximum and minimum note limits asymmetrically relative to the note's nominal size, compensated for note shrinkage. The optimum ratio seems to be 3/5 for the minimum limit and 2/5 for the maximum limit.

Diagnostic 3 = (y – Deadband) x (3/5)

= (5 – 0) x (0.6) = 3.0mm in our example

Diagnostic 4 = (Y – Deadband) x (2/5)

= (5 – 0) x (0.4) = 2.0mm in our example

For the Long Edge:

- Measurement accuracy = ± 1.0mm, cutting tolerance = ± 2mm
- Minimum difference between notes = (1mm x 2) + (2mm x 2) = 6mm
- Deadband = (7mm – minimum difference between notes) = 1mm

Diagnostic 23 = (x – Deadband) x (3/5)

= (7 – 1) x (0.6) = 3.6mm in our example

Diagnostic 24 = (x – Deadband) x (2/5)

= (7 – 1) x (0.4) = 2.4mm in our example

If (Diagnostic 23 + Diagnostic 24) < 5.0mm and/or

If (Diagnostic 25 + Diagnostic 26) < 6.0mm then an alternative method of determining the limits is required.

For the currency above this gives:

£5 = [(70 – 3) to (70 + 2)] x [(135 – 3.6) to (135 + 2.4)]

= [67 to **72**] x [131.4 to 137.4]

£10 = [(75 – 3) to (75 + 2)] x [(142 – 3.6) to (142 + 2.4)]

= [**72** to **77**] x [138.4 to 144.4]

£20 = [(80 – 3) to (80 + 2)] x [(150 – 3.6) to (150 + 2.4)]

= [**77** to 82] x [146.4 to 152.4]

If the above size table is used in an SD machine (short dimension only) then there are overlaps in the table. This is because the upper

limit for £5 is 72mm and the lower limit for £10 is 72mm. If a note is measured as 72mm it could be either a £5 note or a £10 note. Similarly for the £10 upper limit and £20 lower limit.

The solution is to change the £10 lower limit to **72.1**mm and the £20 lower limit to **77.1**mm. There is a chance of mis–assignment but the chance is small as a £10 note would have to be 3mm shorter than nominal to be accepted as a £5.

d. Programming Example using the Results Above.

Overall Machine Limits	==3D==	==SD==
Diagnostic 3 Size Lower Limit (SD & 3D)	3.0mm	3.0mm
Diagnostic 4 Size Upper Limit (SD & 3D)	2.0mm	2.0mm
Diagnostic 23 Long Edge Lower Limit (3D)	3.6mm	N/A
Diagnostic 24 Long Edge Upper Limit (3D)	2.4mm	N/A
£5 Denomination	5	5
Index (Number of Zeros)	0	0
Decimal Point Position	5.	5.
Short Dimension, Low Limit (=Lo)	67.0mm	67.0mm
Short Dimension, High Limit (=Hi)	72.0mm	72.0mm
Long Dimension, Low Limit (”Lo)	131.4mm	N/A
Long Dimension, High Limit (”Hi)	137.4mm	N/A
£10 Denomination	1	1
Index (Number of Zeros)	1	1
Short Dimension, Low Limit (=Lo)	72.0mm	72.1mm
Short Dimension, High Limit (=Hi)	77.0mm	77.0mm
Long Dimension, Low Limit (”Lo)	138.4mm	N/A
Long Dimension, High Limit (”Hi)	144.4mm	N/A
£20 Denomination	2	2
Index (Number of Zeros)	1	1
Short Dimension, Low Limit (=Lo)	77.0mm	77.1mm
Short Dimension, High Limit (=Hi)	82.0mm	82.0mm
Long Dimension, Low Limit (”Lo)	146.4mm	N/A
Long Dimension, High Limit (”Hi)	152.4mm	N/A

4.2 Programming for Difficult Currencies

It is easier to use the Program called **The 2650 Value Software Toolkit** described earlier to handle difficult currencies. However the calculations can be done manually if the program is not available.

If no tolerances are available for the new currency then assume the U.K. cutting tolerances and shrinkage factors apply. However the actual tolerances need to be determined before any serious machine usage with live currency.

a. Example 1

Note Sizes: 122 x 62, 130 x 65, 138 x 68, 146 x 71, 154 x 74, 162 x 77, 170 x 80, 178 x 83

Note Separation: y = 3mm. x = 8mm.

Solution: Use a 3D Machine

Allow Overlaps in Short Dimension Limits

Separate Notes by Long Edge Dimension

Diagnostic 23 = 3.0mm

Diagnostic 24 = 2.0mm

Diagnostic 25 = (x – Deadband) x (3/5)

= (8 – 1mm) x (0.6) = 4.2mm

Diagnostic 26 = (x – Deadband) x (2/5)

= (8 – 1mm) x (0.4) = 2.8mm

Program Size Tables with:

=Lo = (Nominal Short Edge Dimension – 3.0mm)

=Hi = (Nominal Short Edge Dimension + 2.0mm)

”Lo = (Nominal Long Edge Dimension – 4.2mm)

”Hi = (Nominal Long Edge Dimension + 2.8mm)

b. Example 2

Note Sizes: 127 x 63, 133 x **70**, **140** x 76, **140** x **70**

Note Separation: y = 0mm. x = 0mm.

The problem is with two notes pairs (133 x **70** and 140 x **70**) and (**140** x 76 and **140** x 70). The overlaps are such that the notes can be separated with a 3D machine. The 133 x **70** / 140 x **70** pair can be separated on long edge only and the **140** x 76 / **140** x 70 pair can be separated on short edge only.

Solution: Use a 3D machine

Calculate x and y again ignoring a result of zero.

x = 6mm and y = 6mm.

Diagnostic 3 = (6 – 1) x (0.6) = 3.0mm

Diagnostic 4 = (6 – 1) x (0.4) = 2.0mm

Diagnostic 23 = (6 – 0) x (0.6) = 3.6mm

Diagnostic 24 = (6 – 0) x (0.4) = 2.4mm

Program Size Tables with:

=Lo = (Nominal Short Edge Dimension – 3.0mm)

=Hi = (Nominal Short Edge Dimension + 2.0mm)

”Lo = (Nominal Long Edge Dimension – 3.6mm)

”Hi = (Nominal Long Edge Dimension + 2.4mm)

5. INTEGER VALUE DISPLAY AND DECIMAL VALUE DISPLAY

The following applies to all the value counting and dispensing modes.

There are two different value count display modes which are selected automatically depending on whether the denomination value being counted is an integer value, or a decimal value which has the decimal point followed by a two digit decimal fraction. These use both the COUNT display and the BATCH display for displaying the denomination value, and value count total.

Examples:

Integer value display for a value count total of 21520 ; 21 520

Decimal value display for a value count total of 12.50 ; 12 –50

5.1 Integer Value Count Total Display

The integer value count total display is an eight digit integer display which expands to 12 digits as soon as the count total exceeds the eight digits, the display then changing to seven displayed digits with a ’–’ in the leftmost digit position to indicate that there are more upper digits. The upper digits are displayed when the ’TOTAL’ key is pressed, but only when the machine has stopped counting.

Examples:

Integer value display where the value count total does not exceed eight digits, and the count total value is 12345678,

12345 678 displayed.

Integer value display where the value count total exceeds eight digits, and the count total value is 123456789,

Lower digits –3456 789 displayed
Upper digits 12 – – – displayed.

In this operating mode the displayed total flashes (as number count mode).

5.2 Decimal Value Count Total Display

The decimal value count total display is a five digit integer, a decimal point, followed by a two digit decimal fraction. The count total expands to 10 digits as soon as the integer part of the count total exceeds five digits, the display then changing to four displayed integer digits with a '–' in the leftmost digit position to indicate that there are more upper digits, the decimal point and decimal fraction digits remaining unchanged. The upper digits are displayed when the 'TOTAL' key is pressed, but only when the machine has stopped counting.

Examples:

Decimal value display where the integer part of the value count total does not exceed five digits, and the count total value is 12345.67,

12345 –67 displayed.

Decimal value display where the integer part of the value count total exceeds five digits, and the count total value is 1234567.89,

Lower digits –4567 –89 displayed
Upper digits 12 3– – displayed.

The value count total will remain displayed as an integer value while the denomination values of the notes being counted are integer values.

The value count total display will change to a decimal value as soon as a decimal denomination value is being counted and will remain as a decimal value display until it is cleared by pressing the 'CLEAR' key with the 'TOTAL' key held pressed.

When the value count total is cleared by pressing the 'CLEAR' key with the 'TOTAL' key held pressed, the value count total will be set for an integer value display.

In this operating mode the displayed total flashes (as number count mode).

5.3 Manual Denomination Value Entry in Value Counting Mode

Manual denomination value entry is only applicable to value counting on a machine without a size detector, or with manual denomination entry selected. For fixed size mode and mixed bundle mode, the denomination value is read from the size/denomination table in size controller NOVRAM.

When notes are placed onto the feed hopper in value counting mode, pressing the 'START' key will cause the display to change from the value count total display to the current denomination value which is

being used for counting. The machine will start immediately if auto–start has been selected (or use START/STOP key if not). The current denomination value display will be preceded by 'd'.

(Use AUTO selected when counting notes of the same denomination into a bundle. Use with AUTO de–selected when counting notes of different denominations into the same bundle).

Examples:

'd 1 000', 1000 displayed as an integer value.
'd 2 –50', 2.5 displayed as a decimal value.

If the denomination value is correct pressing the 'START' key will cause the machine to start counting (if auto–start is not selected).

A different denomination value may be entered as follows;

– Press the 'CLEAR' key to reset the denomination value to zero.

– Use the numerical keys to enter a valid denomination base value. (An invalid entry will cause the display to reset to zero. Valid denomination base values are 1, 2, 3, 4, 5, 6, 7, 8, 9, 25 and 45).

– Use the '0' key to multiply the displayed denomination value by 10 until the correct number of zeros are on the right hand side of the denomination base value. If multiplying by 10 causes the denomination value to exceed 9000 000 the display will be reset to zero.

– Use the 'BATCH' key to divide the displayed denomination value by 10. If the base denomination value is entered on the display without any following zeros, then pressing the 'BATCH' key will change the display to show the decimal point followed by the fractional part of the denomination value. If the displayed value cannot be further divided by 10, the 'BATCH' key is ignored.

– The '0' and 'BATCH' keys may be used to correct the 10's multiplier for the base denomination value, by multiplying or dividing by 10. If the result of multiplying by 10 produces a value with a zero decimal fraction, the display will revert to an integer display.

Examples:

a. Entered denomination base value = 25

multiplier	displayed value
x 1	d 25
x 10	d 250
x 100	d 2 500
x 1000	d 25 000
x 10000	d 250 000
x 100000	d2500 000
1/10	d 2 –50
1/100	d 0 –25

b. Entered denomination base value = 5

multiplier	displayed value
x 1	d 5
x 10	d 50
x 100	d 500
x 1000	d 5 000
x 10000	d 50 000
x 100000	d 500 000
x 1000000	d5000 000
1/10	d 0 –50
1/100	d 0 –05

Pressing the 'START' key will cause the machine to start counting with the new denomination value.

Appendix 15

26xx Error Code Definitions

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1. INTRODUCTION

Error messages displayed during machine operation include rEP, dEn, CF, FAUlt, JA, CLEAr, HALF, tAbLE, Err Prt, GULP, FEEd, Lid, CLEAn, UnCAL, Found, ibuS, CnS and Error. When some of these messages are displayed additional information about the type of error can be obtained by removing notes from the feed and stacker hoppers and then pressing and holding the Control Key for approximately 3 seconds. The display will show:

‘ 0’	–	for 3 seconds	
‘Exx’		Normal errors	or
‘Fyy’		Fault errors	

When the control key is released the display is retained for approximately half a second. The code cannot be re–displayed. To clear an error, press and release the Control Key.

1.1 Messages rEp, GULP, HALF, tAbLE, FEEd, JA and CLEAr

These messages are displayed if the machine is uncertain of the number of counted notes for the following reasons (press and hold the Control Key for approximately 3 seconds to reveal error number) :

Note: If these errors occur the count should be repeated.

1 Insufficient presence (see 110)
2 Gulp feed.
3 Half note.
4 Torn note.
5 Long first note.
6 Difference between left and right double detect length.
7 Short note.
8 Long note.
9 Abstract note (right hand side).
10 Abstract note (left hand side).
11 Double note.
12 Unknown note less than reference.
13 Unknown note greater than reference.
14 Batch mismatch (overcount).
15 Uncountable overlapped notes.
16 Note detected in transport on start up (at double detector).
17 Note detected in transport during run down (at double detector).
18 Note not found in size table.
19 Value overflow imminent.
20 Value count overflow.
21 Feed error.

22	Jammed feed or noisy double detects.
23	Mixed bundle value balancing doubles detect noise.
24	Value display full.
25	Detector overrun.
26	Denomination count overflow.
27	Batch size too large.
28	Not allocated.
29	Double detect data overrun error.
30	Stacker not clear.
31	Note in machine at power up.
32	Note at transport sensor at machine start.
33	Size detector blocked (dynamic test only).
34	Detector box lid open.
35	Incomplete detector scan during run down.
36	Note seen at double detect during run down.
37	Invalid detector response.
38 – 39	Not allocated.

1.2 Message dEn X (machines with SD or 3D only)

With the message dEn X displayed, pressing the key H1 will display an error number. The X in the message indicates the number of notes down from the top of the stack where the error was detected (1 indicates the top note of the stack). Error numbers include:

40	Short note on the right detector.
41	Long note on the right detector.
42	Greater than 10mm difference between left and right.
43	Note skewed excessively.
44	Short note on the left detector.
45	Long note on the left detector.
46	Overrun (two notes too close together).
47	Long edge measurement short.
48	Long edge measurement long.
49	No note detected during note counting (Under run or SD sensor blocked).
50	No note size match found in size table.
51	Long edge size detector profile error.
52	Currency table error.
53	Size detector error out of range.
54	Not allocated.

1.3 Message CF X (machines fitted with EMG, LV2, IR or UV only)

With the message CF X displayed, pressing the H1 key will display an error number. The X in the message indicates the number of notes down from the top of the stack where the error was detected (1 indicates the top note of the stack). Error numbers include:

55	UV brightness CF.
56	Magnetic presence CF.
57	Metal thread presence CF.
58	IR detector CF.
59	Unknown IR note.
60	Magnetic ratiometric CF (EMG only).
61	Magnetic cross over CF (EMG only).
62	Magnetic detector overrun (ENG and multi–channel).
63	LV2 detector CF.
64	Corner fold prevented IR check.
65	No foil.

1.4 Message CLEAn

With the error message CLEAn displayed, pressing and holding the Control Key for approximately 3 seconds will reveal the error number. Error numbers include:

66	Clean stacker sensor.
67	Not allocated.
68	Clean transport sensor.
69 – 84	Not allocated.

1.5 Message CnS (machines fitted with CMS only)

With the error message CnS displayed, pressing the key H1 will display an error number. Error numbers include:

85	Unsupported command.
86	Invalid command.
87	Invalid data.
88 – 89	Not allocated.
90	Manual stop invoked in CMS.
91 – 95	Not allocated.
96	Bad note reported by detectors with no errors log.
97	Totals update error.

1.6 Message JA and Flt

With the above messages displayed, pressing and holding the Control Key for approximately 3 seconds will reveal the error number. Error numbers include:

JA–100	Transport jammed.
FAULt – 101	Left double detect error.
FAULt – 102	Right double detect error.
FAULt – 103	Left and right double detect error.
UnCALdd – 104	Double detect setup fault ('UnCALdd' displayed)
FAULt – 105	Magnetic detector fault.
FAULt – 106	UV detector fault.
FAULt – 107	SD detector fault.
FAULt–108 & 109	Not allocated.
FAULt – 110	Noisy doubles detect during running.
UnCAL dEt–111	UV detector not calibrated.
UnCAL dEt–112	Size detector not calibrated.
FAULt – 113	Not allocated.
FAULt – 114	Fixed size error.
FAULt – 115–117	Not allocated.
FAULt – 118	No size table data.
FAULt – 119	Invalid denomination.
FAULt – 120	Non volatile memory data error (not initialised or corrupted). Press START to continue. Use diagnostic 14 to program default values.
FAULt – 121	Non volatile memory hard failure (not fitted or faulty).
FAULt – 122	Size table data conflict.
FAULt –123–124	Not allocated.
FAULt – 125	Incorrect feed controller board identity code.
FALUt – 126	UV detector not present, has been removed.
FAULt – 127	SD detector not present, has been removed.
FAULt – 128	2D detector not present, has been removed.
FAULt – 129	IR detector not present, has been removed.
FAULt – 130	LV2 detector not present, has been removed.
FAULt – 131–133	Not allocated.
FAULt –134	LV2 detector fault.
FAULt–135	IR detector fault.
UnCALdEt – 136	LV2 detector not calibrated.
UnCALdEt – 137	IR detector not calibrated.
FAULt–138–149	Not allocated.

1.7 Message Found

With the error message Found displayed, pressing the key H1 will display an error number. Error numbers include:

150	Not allocated	
151	UV detector present warning	)
152	SD detector present warning	) Detector found at
153	2D detector present	) power up which
154–155	Not allocated	) wasn't previously
156	IR detector present	) present.
157	LV2 detector present	)
158–159	Not allocated.	

1.8 Message ibuS

With the error message ibuS displayed, pressing the key H1 will display an error number. Error numbers include:

161–162	Not allocated.
163	No UV response.
164	No Size response.
165	No motor control processor response.
166–167	Not allocated.
168	No detector response.
169	No LV2 detector response.
170	No IR detector response.
171	No general detector response.
172	No CMS response.
173	ISB comms failure.
174–180	Not allocated.
181	Note not seen by UV detector.
182	IR result not ready.
183	Note not seen by size detector.
184–189	Not allocated.
190	Size detector not ready.
191	UV detector not ready.
192	IR detector not ready.
193	LV2 detector not ready.
194–199	Not allocated.
200	LV2 incorrect denomination.
201–254	Not allocated.

1.9 Message Error

With the message Error displayed, pressing the key H1 will display an error number. Error numbers include:

255 Unknown error occurred
Caused by :
- program (EPROM) corrupt.
- RAM (processor fault).
- +5V supply noise.
- Electrical noise on processor signals.
- Software error.

1.10 Message Err Prt

If the message 'Err Prt' is displayed it indicates that the printer is not connected, is off line, is out of paper or not responding.

1.11 Message Lid

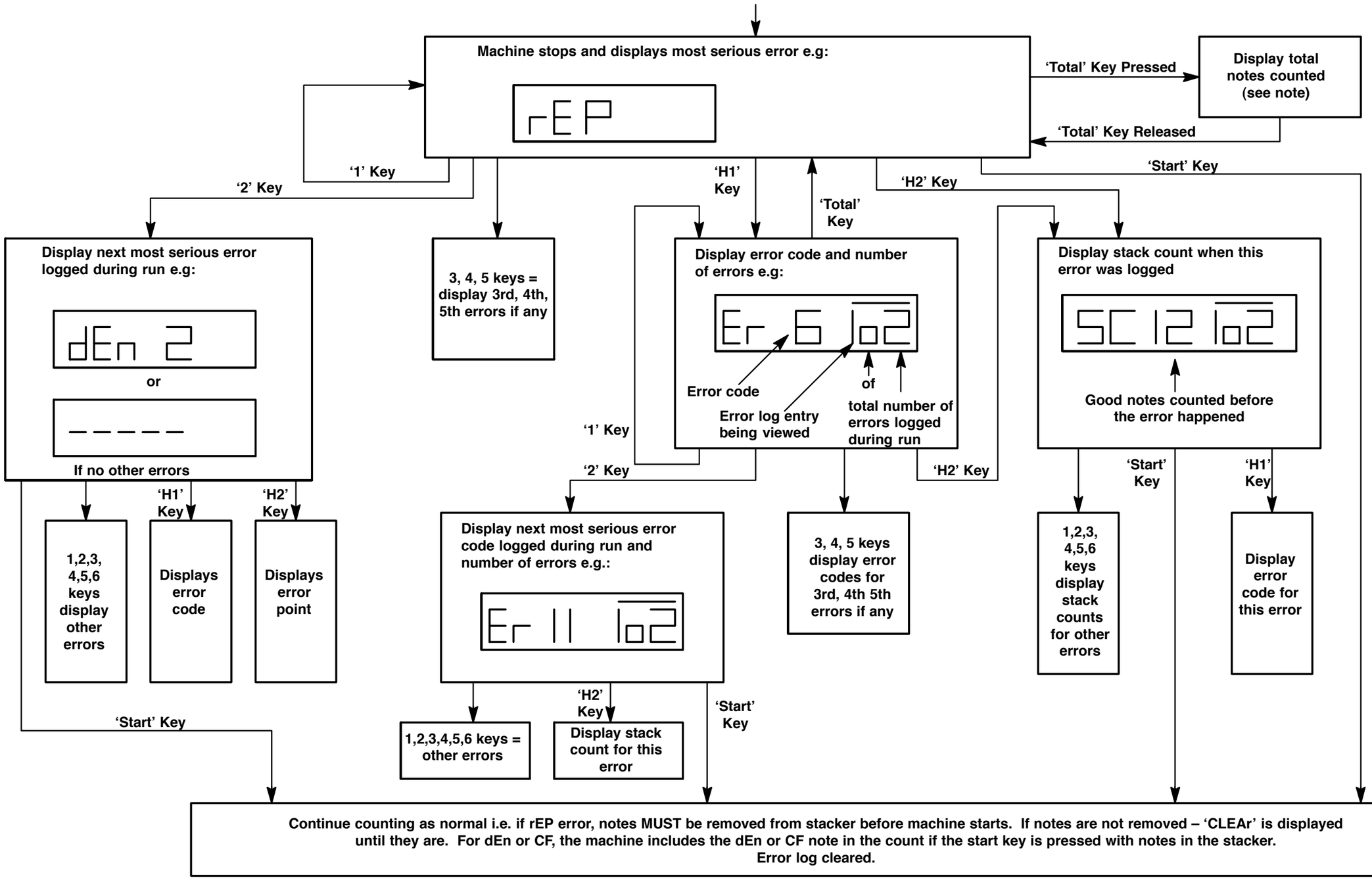
When the error message Lid is displayed, it is an indication that the detector box lid is not closed. Press on both sides of the box until an audible click is heard. The lid is now closed.

1.12 Error Log

The 26xx machine provides an error log such that if there is more than one error associated with a machine stop, there is a method of identifying all of the relevant error information.

The handling of errors and access to the error log is shown in Figure 1.

On restarting the machine, after a stop, the error log is cleared.


Machine stops and displays most serious error e.g:
rEP
'Total' Key Pressed
Display total notes counted (see note)
'Total' Key Released
'1' Key
'2' Key
'H1' Key
'Total' Key
'H2' Key
'Start' Key
Display next most serious error logged during run e.g:
dEn 2
or
If no other errors
'H1' Key
'H2' Key
1,2,3, 4,5,6 keys display other errors
Displays error code
Displays error point
'Start' Key
3, 4, 5 keys = display 3rd, 4th, 5th errors if any
Display error code and number of errors e.g:
Er 6 02
Error code
Error log entry being viewed
of
total number of errors logged during run
'1' Key
'2' Key
'H2' Key
Display next most serious error code logged during run and number of errors e.g.:
Er 11 02
'H2' Key
'Start' Key
1,2,3,4,5,6 keys = other errors
Display stack count for this error
3, 4, 5 keys display error codes for 3rd, 4th 5th errors if any
Display stack count when this error was logged
SC 12 02
Good notes counted before the error happened
'Start' Key
'H1' Key
1,2,3, 4,5,6 keys display stack counts for other errors
Display error code for this error
Continue counting as normal i.e. if rEP error, notes MUST be removed from stacker before machine starts. If notes are not removed – 'CLEAr' is displayed until they are. For dEn or CF, the machine includes the dEn or CF note in the count if the start key is pressed with notes in the stacker.
Error log cleared.

Note: excluding notes counted during sessions resulting in this stop.

Figure 1. Error Log

Appendix 16

1. TECHNICAL BULLETINS/MEMORANDA

1.1 Introduction

This appendix is reserved for the insertion of Technical Bulletin/Memoranda title pages, in accordance with the instructions given at the front of this manual.